

UNIVERSITY FOR DEVELOPMENT STUDIES

ASSESSING THE ROLE OF SOCIOCULTURAL PRACTICES IN THE CONTROL OF
HYPERTENSION IN THE TAMALE METROPOLIS

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ABSTRACT

Hypertension is one of the cardiovascular diseases which is known to be the leading cause of morbidity and mortality in the world, and contributes to about 9.4 million deaths annually, where more than eighty percent occur in the developing world. Mortality from hypertension arises from complications due mainly to inadequate control of the raised blood pressure. Blood pressure measurements at health facilities indicate a high prevalence of uncontrolled hypertension. The main objective of this study was therefore to assess the sociocultural factors that affect the control of hypertension in the Tamale Metropolis.

A cross-sectional survey was conducted to collect information from 356 participants visiting the Tamale Teaching Hospital for clinical care. The Chi-square test was used to determine any associations between uncontrolled blood pressure and patient sociodemographic factors and sociocultural practices. The logistic regression analysis was used to assess the risk associated with these factors in the control of HPT.

There were 36.3% of participants who had uncontrolled systolic BP: in all more female, (33.9%) participants had their diastolic pressure uncontrolled. Only thigh circumference was associated with the control of HPT. Intake of fish and alcohol were associated with control of diastolic pressure ($P = 0.006$ and 0.014). About a third (37.4%) of the respondents had adequate overall knowledge about hypertension but this did not affect the control of HPT; whereas 86.7% knew specifically that taking prescribed medications control HPT. Specific knowledge on effects of alcohol showed an association and was highly predictive of uncontrolled systolic BP ($P = 0.025$). Most participants spent GH¢1-50 on a round trip to the health facility, and cost of visit was associated with uncontrolled systolic pressure. Visiting the hospital when the need arose and following prescribed medication as recommended were all associated with the controlled BP, ($P = 0.033$ and 0.028 respectively).

In conclusion, there was an appreciable level of uncontrolled HPT within the Tamale metropolis (36.2%). The consumption of alcohol and eating habits, where less fish was consumed did not favour the control of raised blood pressure. There was less than average level of knowledge about HPT among sufferers, and not knowing specifically that intake of alcohol was not appropriate in hypertensives strongly affected the control of the disease.



TABLE OF CONTENT

| | |
|-------------------------------------|----------|
| Abstract | í |
| Table of content | ii |
| List of tables | vii |
| List of figures | ix |
| Acknowledgement | x |
| Author’s declaration | xi |
| Dedication | xii |
| Acronyms | xiii |
| | |
| CHAPTER 1 | 1 |
| INTRODUCTION | 1 |
| 1.1 Background | 1 |
| 1.2 Problem statement | 3 |
| 1.3 Rationale of study | 5 |
| 1.4 Research questions | 5 |
| 1.5 Objectives of the study | 6 |
| 1.5.1 Principal objective | 6 |
| 1.5.2 Specific objectives | 6 |
| 1.6 Relevance of the study | 7 |
| 1.7 Scope of the study | 8 |
| 1.8 Framework | 9 |
| 1.9 Profile of the study area | 14 |



| | |
|--|----|
| 1.9.1 Population size, distribution and growth rate..... | 16 |
| 1.9.2 Disease situation..... | 16 |
| 1.9.3 Health facilities | 17 |
| 1.10 Overview of methodology..... | 17 |
| 1.11 Structure of this thesis..... | 18 |

CHAPTER II 19

LITERATURE REVIEW 19

| | |
|---------------------------------------|----|
| 2.1 Hypertension | 19 |
| 2.2 Risk factors of hypertension..... | 20 |
| 2.2.1 Traditional risk factors | 21 |
| 2.2.1.1 Lipids | 21 |
| 2.2.1.2 Overweight and obesity..... | 22 |
| 2.2.1.3 Diabetes..... | 24 |
| 2.2.1.4 Inadequate diet | 25 |
| 2.2.1.5 Physical inactivity | 27 |
| 2.2.1.6 Tobacco smoking | 28 |
| 2.2.1.7 Alcohol consumption | 29 |
| 2.2.1.8 Family history | 31 |
| 2.2.1.9 Age and sex | 32 |
| 2.2.1.10 Vascular inflammation | 33 |
| 2.2.1.11 Psychological stress..... | 34 |
| 2.2.2 Sociocultural factors | 35 |
| 2.2.2.1 Health systems | 36 |



| | |
|---|-----|
| 2.2.2.2 Family decisions | .37 |
| 2.2.2.3 Lifestyles changes | |
| 2.2.2.4 Social risk factors | 38 |
| 2.2.2.5 Socioeconomic transformation (Urbanization) | |
| 2.3 Control of hypertension | 45 |
| 2.3.1 Non pharmacological | 45 |
| 2.3.2 Pharmacological | 46 |
| 2.3.3 Policies development and implementation | 48 |
| 2.4 Factors affecting the control of hypertension | 50 |
| 2.4.1 Knowledge about hypertension | .50 |
| 2.4.2 Economic | 51 |
| 2.4.3 Medication compliance | 52 |
| 2.5 Consequences of uncontrolled hypertension | .53 |

CHAPTER III 56

METHODOLOGY 56

| | |
|--|-----|
| 3.1 Study design and method | 56 |
| 3.2 Study site | 56 |
| 3.3 Study population | .57 |
| 3.4 Sample size determination | 58 |
| 3.5 Participants selection | 58 |
| 3.6 Data collection tools and methods | 59 |
| 3.7 Definition of study variable | 60 |
| 3.8 Data handling, analyses and presentation | 61 |



3.9 Ethical consideration

| | |
|---|----------|
| CHAPTER IV | 63 |
| RESULTS | 63 |
| 4.1 Characteristic of participants data | 63 |
| 4.1.1 Sociodemographic characteristics | 63 |
| 4.1.2 Respondents blood pressure status and body size indicators | ..65 |
| 4.1.3 Sociocultural practices | .66 |
| 4.1.4 Participants knowledge about hypertension | 70 |
| 4.1.5 Economic commitment and social implications of uncontrolled hypertension..... | 74 |
| 4.1.6 Attitude towards therapy for the control of hypertension | 76 |
| 4.2 Effects of patient factors and practices on the control of high blood pressure | 78 |
| 4.2.1 Sociodemographic characteristics and BP status | 78 |
| 4.2.2 Effects of sociocultural practices on BP status | 81 |
| 4.2.3 Body size indicators and the status of BP | 83 |
| 4.2.4 Knowledge about hypertension and the control of high blood pressure (HBP) | 85 |
| 4.2.5 Effects of economic status on the control high blood pressure | 86 |
| 4.2.6 Compliance with treatment and the control of hypertension | 87 |
| 4.3 Predictive effects on the control of hypertension | 88 |
| CHAPTER V | ..91 |
| DISCUSSION..... | 96 |
| 5.1 Sociodemographic characteristics and the control of high blood pressure | 91 |



| | | |
|-------|--|-----|
| 5.2 | Common sociocultural practices associated with the control of blood pressure | 93 |
| 5.2.1 | Effects of sociocultural practices on the control of hypertension | 97 |
| 5.3 | Effects of body size indicators on the control of high blood pressure | 99 |
| 5.4 | Effects of knowledge on the control of hypertension | 100 |
| 5.5 | Economic effects and the control of hypertension..... | 101 |
| 5.6 | Compliance with treatment and the control of HBP | 102 |

CHAPTER VI 104

CONCLUSION AND RECOMMENDATION 104

| | | |
|-----|-------------------------|-----|
| 6.1 | Main findings | 104 |
| 6.2 | Study limitations | 105 |
| 6.3 | Recommendation | 106 |
| 6.4 | Conclusion | 107 |
| 6.5 | Future directions | 108 |

REFERENCES111

APPENDICES131

| | | |
|--------------|----------------------------------|-----|
| Appendix I | Questionnaire | 130 |
| Appendix II | Ethical committee approval | 142 |
| Appendix III | Authority from study site | 143 |



LIST OF TABLES

| | |
|---|----|
| Table 4.1: Distribution of sociodemographic characteristics of respondents (N= 356) | 64 |
| Table 4.2: Means and standard deviations of blood pressures, age and anthropometric parameters of respondents (N= 356)..... | 65 |
| Table 4.3: Distribution of respondents according to risk of CVD with respect to blood pressure, gender and anthropometric measurements(BMI, WC, and TC) | 66 |
| Table 4.4: Distribution of types of foods often eaten, and the consumption of foods in days per week (N= 356) | 68 |
| Table 4.5: Numbers (percentages) of respondents indulged in common lifestyle habits (N= 356) | 69 |
| Table 4.6: Distribution of respondents source of medicines and benefits from media advertisements regarding medicines use..... | 70 |
| Table 4.7: Distribution of knowledge of respondents on values for high blood pressure, and how to reduce HBP | 72 |
| Table 4.8: Distribution of responses on food, social and lifestyle habits that could make the control of HBP difficult | 74 |
| Table 4.9: Economic commitment and social implications of HBP | 75 |
| Table 4.10: Distribution of attitude towards treatment of hypertension | 77 |
| Table 4.11: Illustration of influences of sociodemographic characteristics on the control status of HBP | 79 |
| Table 4.12: Distribution of effects of anthropometric parameters (BMI, WC and TC) on the status of HBP | 82 |
| Table 4.13: Effects of food eating habits on the control of HBP | 84 |
| Table 4.14: Effects of knowledge on the control of hypertension | 85 |



Table 4.15: Association between economic status and the control of hypertension.....87

Table 4.16: Illustration of participants attitude towards treatment on the status of blood pressure 88

Table 4.17: Factors that have predictive effect on the control of hypertension.....90



LIST OF FIGURES

| | |
|--|----|
| Figure 1.1: Conceptual framework | 9 |
| Figure 4.2: Distribution of health practices among respondents (N=356) | 67 |
| Figure 4.3: Illustration of types of Faith health healing practices (=356) | 67 |
| Figure 4.4: Respondents knowledge levels on hypertension and its risk factors | 71 |
| Figure 4.5: Distribution of sociocultural factors that could make the control of HBP difficult..... | 73 |
| Figure 4.6: Distribution of when respondents seek more attention for their HBP condition | 76 |



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AUTHOR'S DECLARATION

This thesis has been composed as a document of the original work carried out by Isaac A.

Yarindow

All data were originally gathered and analysed by the author of this thesis unless explicitly stated otherwise in the text.

This thesis does not incorporate, without due acknowledgement, any previously submitted for a diploma or degree in any institution or university.

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DEDICATION

With all the love and heartfelt gratitude these humble words can be meaningfully expressed, I dedicate this dissertation to the Most High God through His Son and The Holy Spirit, Amen; without the Trinity continues love, encouragement, support and patience it would not have been possible to accomplish this work.



ACRONYMS

| | |
|---------|------------------------------------|
| BMI | Body mass index |
| BNP | B-type natriuretic peptide |
| CAD | Coronary artery disease |
| CDC | Centre for disease control |
| CRP | C-reactive protein |
| CVDs | Cardiovascular diseases |
| FAO | Food and Agricultural Organization |
| GRS | Genetic risk score |
| GSS | Ghana Statistical Services |
| HBP | High blood pressure |
| HDL | High density lipoprotein |
| HPN/HPT | Hypertension |
| LDL | Low density lipoprotein |
| LR | Logistic regression |
| METs | Metabolic syndrome |
| MUFA | Monounsaturated fatty acid |
| N or No | Number |
| P | P-value |
| PUFA | Polyunsaturated fatty acid |
| SFA | Saturated fatty acid |
| SNP | Single nucleotide polymorphisms |
| TC | Thigh circumference |
| WC | Waist circumference |
| WFP | World Food Programme |
| WHO | World Health Organization |



CHAPTER I

INTRODUCTION

1.1 Background

Hypertension as one of the cardiovascular diseases (CVDs) is one of the major causes of morbidity and mortality in the world, (Kayima et al., 2013; Bosu, 2013; van d-Vijver et al., 2013). Sociocultural practices, lifestyles habits and other conditions that people may not be aware of are factors that impact negatively on their blood pressure status (Beune et al., 2006; van d-Vijver et al., 2013; Norman, 2014)

Sociocultural practices include health care practices, food habits, smoking or chewing tobacco, alcohol intake, physical exercise level, socialization, marketing of health products and religious beliefs. These sociocultural practices may normally lead to the development of known risks to CVDs like overweight or obesity, high blood pressure, diabetes and high cholesterol among others. In the event that high blood pressure is not adequately controlled stroke, ischaemic heart disease, myocardial infarction and heart attacks often result (Lang et al., (2012); Goverwa et al., 2012; van d-Vijver et al., 2013;).

Cardiovascular diseases cause about 17.3 million deaths yearly worldwide with hypertension being responsible for 9.4 million deaths (WHO, 2013). The sociocultural influences arise from an individual's, a family's, or society's decisions to seek a certain type of health solution (herbal, spiritual or biomedical) or to self-medicate, (Aikins, 2012; Aikins et al., 2010). Sometimes, a person may not even seek for any health attention, and the situation may be seen as normal to the individual and the society as a whole. For instance, while Ghanaians may



regard plumpy body and look at overweight as a desirable body feature, the western world and biomedical science regard it as undesirable and may be a risk to uncontrolled hypertension.

Hypertension and its control are influenced by globalization, industrialization and urbanization due to global trade, economic development (especially in the low income countries), exchange of lifestyle behaviours and technological advancements. A large-scale survey on diet, physical activity level, overweight and obesity indicated a rapid dietary and activity pattern shifts, resulting in major shifts in obesity on a worldwide basis where the burden of obesity is shifting towards the poor (Biritwum et al., 2005). More than 1.4 billion adults above 19 years were overweight with over 200 million men and nearly 300 million women being obese; 35% of adults of the same age were overweight and 11% were obese in 2008 (WHO, 2011).

Currently, hypertension and the difficulty in controlling it is a public health concern worldwide as it is the most common cause of morbidity and mortality among non-communicable diseases, (Kayima et al., 2013; Bosu, 2013; Bansa, et al., 2014). A person could be considered hypertensive when an average of 3 or more consecutive measurements of blood pressures, are above the generally acceptable normal average of 120/80mmHg. Uncontrolled hypertension causes coronary artery disease and stroke (approximately 47% coronary artery disease and 54 % stroke cases), (Bosu, 2010; Arabzadeh et al, 2013; Goverwa et al, 2012; WHO, 2013; Musinguzi et al, 2014). In Ghana, the prevalence of hypertension is from 25% to 48% with outpatient reported increase of over ten-fold from 49,087 in 1988 to 505,180 in 2007 (Tagoe, 2012; Bosu, 2013).

Uncontrolled hypertension may be caused by factors such as inadequate knowledge, unhealthy lifestyle, ineffective treatment or inappropriate attitude, (Bosu, 2010; Arabzadeh et al, 2013; Goverwa et al, 2012; WHO, 2013 and Musinguzi et al, 2014). Other risk factors are



characteristics which are constitutive of the individual (age, genetics, family history, BMI, WC, TC etc) and in conditions such as overweight, obesity, diabetes and atherosclerosis, (Denker and Cohen, 2013; Heitmann and Frederiksen, 2009 and Kjeldsen et al, 2008).

1.2 Problem statement

The leading cause of death in the world is cardiovascular disease (CVDs), causing the loss of about 17 million lives yearly of which hypertension accounts for 9.4 million, WHO (2013). Deaths from ischaemic heart disease (45%) of CVDs and stroke (51%) are due to hypertension. More than 80% of these cardiovascular disease associated deaths occur in low and middle income countries, almost equally among men and women (World Heart Day, 2009). The prevalence of high blood pressure has significantly increased from about 4.5 percent (nearly 1 billion adults) in 2000 to 7 percent in 2010, (van d-Vijver et al, 2013; Ogah et al, 2012). This affected about 80 million adults in 2000 and is projected to reach about 150 million by 2025 in sub-Saharan Africa. According to WHO Global Health Observatory (GHO) data, the Africa region has the highest hypertension prevalence of 46% of adults age 25 years and above in 2008, with studies by Kayima et al. (2013) and van d-Vejver et al. (2013) showed that among the 60 years and above elderly it is said to be 50 or up to 70% in some areas. It was mainly associated with more affluent regions of the world in the past but, it is now increasingly emerging in the low and middle-income countries (LMICs). Currently, the worldwide burden of hypertension is greatest in LMICs where it affects about 1 in every 5 of the adult population and this is expected by 2025 to rise to almost 3 out of every 4 people (van d-Vijver et al., 2013). This is not only an epidemic and risk for CVDs but, an important public health problem



including a big economic impact as this will have significant negative implications for the future.

Globalization and urbanization associated with National development, social lifestyle changes and nutritional transitions are driving forces for CVDs generally, and hypertension in particular especially, in sub-Saharan Africa where Ghana is located. Studies on prevalence of hypertension in Ghana showed it to be higher in urban areas and low in rural areas (Bosu, 2010). The prevalence ranges from 19% to 54.6% with higher prevalence associated with urban areas (Addo et al, 2012; Bosu, 2010; Bosu, 2013). Awareness about hypertension in Ghana has been put between 23.3% and 30%, and was shown to be high among the elderly (Addo et al, 2012; Lloyd-Sherloch et al., 2014; Bosu, 2013).

Tamale metropolis, which is in a developing country like Ghana, is still undergoing modernization and urbanization, and migration into urban areas due to economic and social factors may facilitate adoption of western sociocultural lifestyles habits that are known to increase the risk of CVDs. According to Metropolitan planning coordinating unit (MPCU) (2010), there was to be an increased population in 2010 (414,548) projected from 2000 population due to migration of people and economic development of the city which now has a population density of 318.6, compared to the national average figure of 25.9. The Tamale Teaching Hospital 2010 annual report on OPD attendance and admissions indicated that the proportion of hypertensives although varied has been substantial. Using 2009 as a base year with a figure of (1598), the percentage proportions were respectively 77.0% in 2010, 49.2% in 2011, 49.0% in 2012 and 159% in 2013. The socioeconomic development and urbanization processes, the increasing population and in addition to continuous migration into the city, with ever yearly increasing proportions in hypertension is a concern. There was therefore the need



for research into the changing cultural and social life styles of the people, and how these affect the efforts in controlling HPT. Results generated will inform the appropriate agencies and interested health stakeholders to develop strategies that will help address the problem.

1.3 Rationale of the study

Hypertension as one of the major contributing factors to both morbidity and mortality remains a high public health and health service providers concern. Much regard has not been given to the diseases within the population in the past except among the wealthy. The trend of lifestyle changes in developing countries and Ghana, most particularly in the middle class has led to a fast rise in disease burden in the population. Attention is now drawn to determinants or root causes and associated risk to CVDs including hypertension. Hypertension and its risks are among the major causes of illness, incapacitation and economic loss to individuals and families in the Northern Region and the country as a whole. Tamale Metropolis in the Northern Region has no data on factors that influence the effort to control HPT. It is with this regard that this study focuses on assessing the socio-cultural practices that affect the effective control of raised blood pressure.

1.4 Research questions

After reviewing the literature that informed this study, it became pertinent to find answers to the following questions

1. What are the common sociocultural practices that may be associated with uncontrolled blood pressure?



2. What is the relationship between patient's sociodemographic characteristics and uncontrolled blood pressure?
3. What are the effects of body size (BMI, WC, and TC) on the control of high blood pressure?
4. What are the effects of sociocultural practices on the control of high blood pressure?
5. Does knowledge of the diseases, hypertension, influence the control of high blood pressure?
6. What are the effects of compliances with anti-hypertensive treatment on the control of hypertension?

1.5 Objectives of the study

To effectively answer the set questions above, the following objectives were identified:

1.5.1 Main objective

The main objective of the study was to assess the effects of patients characteristics and common sociocultural practices on the management of hypertension among adults

1.5.2 Specific objectives

To achieve the main objective set above the specific objectives where to:

1. identify common socio-cultural practices that are associated with uncontrolled bloodpressure



2. describe the relationship between patients' socio-demographic characteristics and the control of hypertension
3. assess the effect of body size indicators (BMI, WC, TC, etc) on the control of high blood pressure
4. determine the effects of socio-cultural practices on the control of hypertension
5. assess the influence of knowledge on the control of high blood pressure
6. determine the effect of compliance with antihypertensive therapy on the control of hypertension

1.6 Relevance of the study

Cardiovascular diseases (CVDs) are world leading causes of death, with about 17.3 million people yearly with hypertension taking about 9.4 million people of which more than 80% take place in low and middle income countries. Modifiable risk factors including diabetes, overweight, inadequate diet, inadequate physical exercise among others and non-modifiable risk factors such as gender, age, family history and genetics lead to the development of hypertension. Ghana being a middle income country is still battling with infectious diseases due to inadequate economic and human resource capacity to handle it. To also battle with non-infectious diseases like hypertension and its risk factors, must be worrying problems to all stakeholders.

Globalization, industrialization and urbanization drive growth and development and that influences sociocultural lifestyles in the process of exchange of goods and services mostly occur in rapidly developing urban areas such as Tamale. Tamale Metropolis is one of the



developing cities in West Africa currently, with diverse ethnic groups. There are migration and import of various economic, social goods and life habits into the city which is likely to transform socio-cultural life styles which may promote hypertension. This borders on the effective control of the disease using available treatments, and factors that may influence their control effort.

Owing to the lack of available data on the determinants of the control of hypertension in Tamale Metropolis, it is relevant to conduct a study that would investigate these factors. When these sociocultural practices and how they affect the control of hypertension are ascertained, the information will necessarily be available to stakeholders of health such as the Ministry of Health, other bodies in health management, researchers, academicians and students to use for policy decisions in health management and research. Robust quantitative and qualitative studies are needed to increase understanding of the complex social behaviours, psychological and cultural contexts of risk, illness experience, care giving and social attitudes with regards to controlling the level of blood pressure (Aikins, 2012).

1.7 Scope of the study

The study covered the participants sociodemographic and sociocultural practices that are associated with the occurrence of uncontrolled hypertension. Literature was reviewed on the prevalence and status of hypertension based on risk factors that were categorised into main sections as traditional and sociocultural risk factors. Participants of the study were drawn from the Tamale metropolis, and blood pressure values were determined alongside their body size determined by the BMI, WC and TC. Information from participants was on life style habits, knowledge on hypertension, management and compliance with therapy. The study also covered



traditional risk factors like age, genetics, psychological stress, diabetes and obesity, which were considered in analysing results of data obtained.

1.8 Framework

In this study, factors that may affect the control of hypertension were investigated within the interplay of factors such as sociodemography, modifiable factors, lifestyle habits and drug compliance (Fig 1). The conceptual framework was adapted from frameworks of physiological or energy imbalance process models (Balogopal et al., 2011), and psychosocial models (International of Epidemiology, 2002) and PRECEDE (Philips et al., 2012 and Gallani et al., 2013).

Figure 1.1: Conceptual framework

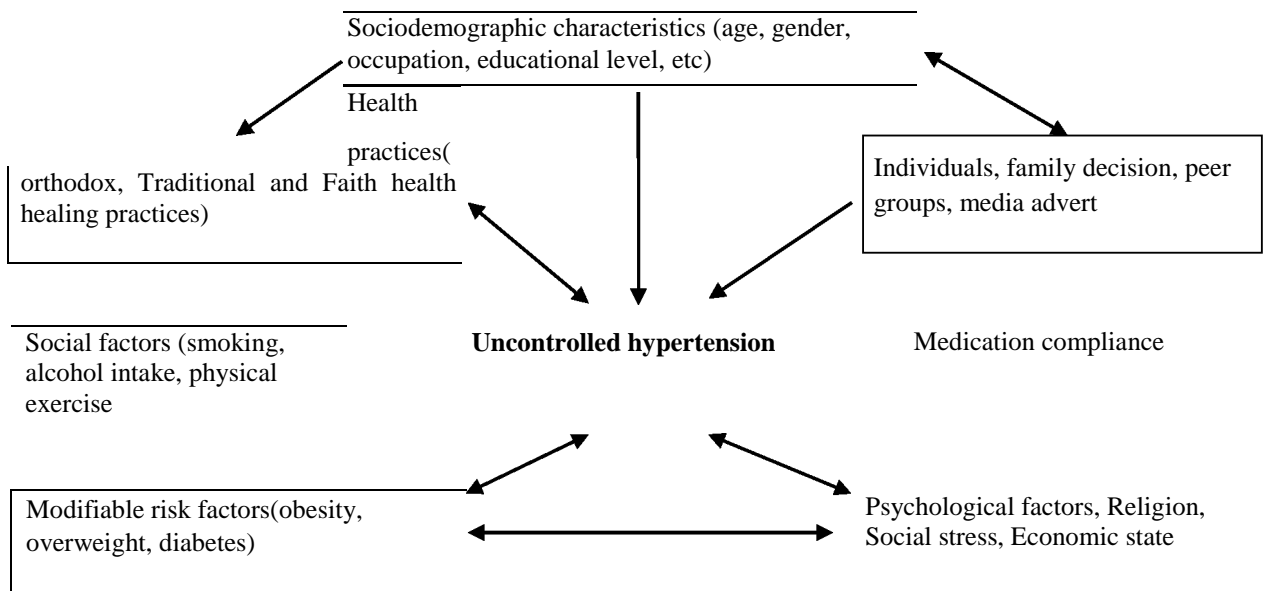


Fig 1. Adapted from physiological or energy imbalance process by Balogopal et al. (2011), and PRECEDE model by Philips et al and Gallani et al. (2012 and 2013 models).

The interplay of those risk factors that account for uncontrolled hypertension are briefly explained with regard to non-modifiable risk factors such as age and gender; influencing





factors such as media and family decision; psychological risk factors, modifiable risk factors such as overweight and inappropriate alcohol intake, social factors and health systems such as seeking for types and practices of health care.

Hypertension is generally known to correlate with increasing age where the systolic reading is often implicated. A study by Bansa et al (2014) showed that the prevalence of hypertension was 5% among 15 to 24 years old, and nearly two-third of those 55 years or older would along be hypertensives. The age effect responsible for this prevalence may also reflect in challenges towards the control of HTP. Besides age is the effect of gender in which hormonal (oestrogen) changes in the reproductive age favour the control of raised blood pressure.

Another non-modifiable risk factor is genetic and family history with studies indicating that increased arterial stiffness, which is associated with high blood pressure, is strongly linked to a single nucleotide polymorphism (Phababpha et al., 2013). Environmental influences on the gene at the young and adult ages to old age lead to development of hypertension, and when subsequently not controlled results in organ damage. Studies revealed that, if a first degree family man relative before the age 55 years, and woman relative before age 65 years who suffers stroke, which is almost always as a result of high blood pressure, then the stroke is more likely to occur in subsequent generations (Khatib and El-Guindy 2005; WHO, 2013).

Media adverts on health products such as health practices, foods, diets, drinks and medicines which normally are not accompanied by the right prescriptions to individuals and social needs influences the intake of inadequate foods, diets, alcohol, and drug self medication and non compliance. It also has the tendency of influencing the low income groups inability to meet their health needs through the inadequate income for prescribed dosage and regimen of health products. Adverts promote healer-shopping for health services, use of wrong drugs, create dose



problems, delay the seeking for appropriate management that may complicate conditions like diabetes and high cholesterol into myocardial infarction and hypertension. Families, key individuals and peer groups always have the ability to impact on individuals within the family or group and others outside through smoking, alcohol drinking, food and diet habits, beliefs, occupation, type of health services acquisition and intake of medications.

Treatment compliance either drug or non-compliance may be influenced by belief of an individual or family that a particular health product may not provide the required benefit to the patient. Compliance may also be determined by availability and affordability of the treatment.

Beliefs, psychological stress, occupation and Economic state are factors associated with the development of hypertension and may impact on its control. Beliefs around accessing health are almost and always connected to religion and the type of health practices which may be influenced by media adverts. Beliefs could promote healer-shopping, hinder the accessibility of appropriate medication, and encourage self medication.

Psychological stress as a factor may interact with the level of beliefs, economic state and social support from individuals, family and community. Where the beliefs are supported by good economic state and social support with availability of the right or acceptable health service there would be proper medication compliance and prevention of self-medication.

Occupation determines the income level, therefore the economic state of an individual or family. Income level determines the ability to access appropriate remedies for a condition like hypertension, and may prevent noncompliance and self-medication. The ability to afford appropriate health care promotes sound psychological emotions, assured occupation and facilitates social stability. The contemporary view is that social and psychological factors are implicated in all diseases and may play an important role in their management.



Overweight, obesity, diabetes, and hyperlipidaemia normally lead to the development of CVDs through uncontrolled hypertension. These risk factors may interact with physical, psychosocial, predisposition and environmental factors to hinder efforts in the control of raised blood pressure. Overweight and obesity could be a result of genetic factors or imbalance of energy intake from carbohydrates and saturated fats in particular. Energy imbalance accompanying physical inactivity may lead to high cholesterol level and high blood pressure from narrowing blood vessels due to deposition of cholesterol and calcium plaques in arterial endothelium to harden the vessels establishing a condition known as atherosclerosis.

From studies, type 2 diabetes (T2D) could begin to be established in childhood from inadequate intake of food influenced by familial, social, occupation and leisure time usage that go along with lower level of physical activity. Also, T2D has higher rate of dyslipidemia, tend to have increased triglyceride concentrations and decreased HDL cholesterol concentrations which is an important CVD risk factor, (Raffield et al., 2013).

According to Belue et al. (2009) and Lloyd-Sherlock (2014), lifestyle factors such as diet, exercise, excess alcohol and smoking contributes greatly to uncontrolled HPT in SSA. The emergence of a nutritional transition which entails eating habits that are characterized by shifting to a higher caloric content diet and less physical activity due to urbanization and economic development are thought to let to rising levels of CVDs risk factors, including uncontrolled hypertension.

Inappropriate diet and excess alcohol can precipitate overweight, obesity and diabetes which can lead to high blood pressure, hypercholesterol, high LDL and atherosclerosis. Inadequate intake of excess energy foods (saturated fats, carbohydrates) lead to development of fatty tissue in the body, a potential risk for overweight, obesity and hyperlipidaemia



(hypercholesterolaemia, hypertriglycerides, high LDL) that can bring about diabetes or insulin resistance, atherosclerosis and narrowing of blood vessels. Without enough exercise this could affect the control of hypertension.

Uncontrolled hypertension has been linked with both active and passive (environmental) cigarette smoking, snuffing or chewing of tobacco. Epidemiologic studies strongly support the assertion that cigarette smoking in both men and women increases the incidence of myocardial infarction and fatal coronary artery disease (Ambrose and Barua, 2004). Smoke contains nicotine, carbon monoxide and oxidants that induce clogging, hypercholesterolaemia leading to atherosclerosis, narrowing of blood vessels resulting in increase in blood pressure and other cardiac diseases like hypertension. The toxins in tobacco smoke lower a person's high density lipoprotein cholesterol (HDL or "good" cholesterol) while raising levels of low-density lipoprotein cholesterol (LDL or "bad" cholesterol) and increased risk of diabetes mellitus (Centre for Disease Control and Prevention, 2010). Smoking in high blood pressure individuals with hypertension can increase the risk of malignant hypertension which can pose a challenge to the effective control of the BP. Cigarette smoke, snuffing or chewing could be socially influenced by individual's, family or peers.

The association between alcohol consumption and hypertension was first reported in 1915 by Lian (Clark, 1985; Maheswaran et al., 1991). Cognitive behavioral models of alcoholism emphasize the importance of cognitions (thoughts, understanding and beliefs), with the initial use of alcohol or other drugs being viewed as the result of many interacting factors such as genes, temperament, and other psychological or social factors. Social learning and social control theories observe that a wider context within social environments provide for biological,



psychological, and personality factors to interact in determining a person's susceptibility to develop alcohol use problems.

There are many health practices including Orthodox, Traditional and Faith healing health practices that health seekers can embark on. These health practices create a situation of healer-shopping by sick customers moving from one health practices or practitioner to the other as there is no satisfaction or adequate healing or management of their sickness. Traditional and Faith healers are always sought after in treatment of diabetes, hypertension and adverse CVD outcomes such as stroke (BeLue et al., 2009). Health seeking behaviour to some extent depends on individual belief that allows access of health care services from one or more of the health practices. This may either prevent, prolong or led to wrong access of the right services. This may complicate or further create other problems including difficulty in controlling an established hypertension. Untreated or inadequate management of this condition may pose psychological and social states, such as depression, anxiety and social isolation. The healer-shopping could also lead to non-compliance with medication since out of the lack of satisfaction with particular health services provider, patients would seek alternative sources.

1.9 Profile of the study area

The study was conducted in the Tamale Metropolis which is the capital city of northern region of Ghana, and also one of the 20 administrative and political districts in the region. Tamale Metropolitan area is located at the centre of the northern region of Ghana, and lies between latitude 9.16 and 9.34 north and longitude 00.36 and 00.57 west. It shares boundaries with Saveligu/Nantong districts to the north, Tolong/Kumbugu districts to the west, Miong and Salaga districts to the east, and Central Konja to the south. The Metropolis has an estimated



land area of 750 km sq which is about 13% land area of the region (MCPU 2010 and TAMA 2012). It is located within the savanna equatorial belt, and experiences an alternating raining season from May to October with dry season from December to April in a year with the usual dry hamarttan winds occurring in December to February. There is an average rainfall and temperature of 1000mm and 28 degree celcius where yearly temperature ranges from 26 to 38 degrees celcius.

For administrative purposes, the metropolitan activities are subdivided into subsectors including governance, education, agriculture, water and sanitation, transport, and health that with the Tamale Metropolitan Assembly as political head of governance coordinating the activities with the private sector for development.

The educational sector is run by the Metropolitan Education Directorate where the activities from nursery to the training colleges are controlled, excluding the tertiary institutions consisting of; University for Development Studies (UDS) and Tamale Polytechnic. The UDS at the Tamale campus trains health and education professionals as at the time of collecting data. There are also two teacher training colleges, one nurses training College, ten senior high schools, and one vocational/technical institute.

Metropolitan Agricultural Directorate directs and controls agricultural and related activities in the Metropolis (TAMA, 2012). Crops such as maize, rice, yam and cassava are cultivated by farmers within the limited land area found for cultivation in the metropolis but, most farmers cultivate their crops and reared animals outside the Metropolis. Different animals like ruminants and fowls are reared on intensive, semi-intensive and free range bases.

The transport sector as one of the subsectors, handles roads and transport businesses with many developed tarred and untarred roads. Telecommunication is another business area which is a



sector with network owned by both government and private sector such as Onetouch, Tigo, MTN, GLO ltd and Ghana post telecommunication. There are many private business institutions like banks, insurance companies, and NGOs (TAMA 2012). Numerous petty traders can be found at various marketing locations, dealing in various products like foods, wears, machines and spare parts.

1.9.1 Population size, distribution and growth rate

The population of the Metropolis was estimated to be 371,351 in 2010 population census (GSS 2012) with males being 185,995 and females 185,356 with an intercensal growth rate of 2.9%. However, according to the Tamale Metropolitan Coordinating Planning Unit, the Metropolis is estimated to be 414,548 in 2010 and 444,074 in 2012 with males being 222,095 (50.00%) as projected from 2000 national population census with an intercensal growth rate of 3.5%. It has a population density of 318.6 person's per square kilometer which is twelve times higher than the national figure of 25.9 person's per square kilometer.

1.9.2 Disease situation

Malaria has been at the top of all diseases, followed by skin and acute respiratory diseases as reported in 2010 by Tamale Metropolitan Health Services Directorate (MHSD) from 2004-2008 with hypertension always at the eighth position but, became seventh in 2008. This increased from 8644 in 2005 to 20890 for the region, and 2892 in 2005 to 6967 in 2009 for Tamale Metropolis (Data available at the Regional Health Directorate, 2010). However, this rose in 2012 to 52924 for the region, and then to 16723 for the metropolis. According to the Tamale Teaching Hospital 2011 annual report on the outpatient department (OPD) patients,



hypertension was 6th in 2009 (1598 hypertensives) and 5th in 2010 (1230 hypertensives) which rose to 2546 in 2013 (biostatistics office records, 2014).

1.9.3 Health facilities

According to the Tamale Metropolitan Coordinating Planning Unit (MCPU), as at 2010 the metropolis had thirty four health facilities excluding the Tamale Teaching Hospital. There were twenty government health facilities with two being hospitals, nine health centres and clinics, three nutritional rehabilitation centres, two functional community health organization (CHO) compounds, 10 private health facilities and others community initiated and quasi-government clinics.

1.10 Overview of methodology

This research was aimed to assess common sociocultural practices effects on the control of hypertension. A cross-sectional survey, using a questionnaire, was designed to gather data on sociodemographic characteristics, anthropometric parameters sociocultural practices, lifestyle habits, knowledge on hypertension, management of hypertension and therapy compliance to hypertension.

A total of 356 participants were included considering a confidence interval of 95% and a margin of error of 0.05 as precision with a hypertensive prevalence of 36.5%. Participants consents were sought, and those who agreed to partake were randomly selected for blood pressure and anthropometric measurement, followed by response to questions under the research questionnaire by trained research assistants.



With the use of Microsoft office excel 2013 computer soft (IBM version 20) data was cleansed up and statistical analysis conducted. Statistical techniques such as Chi-square, Pearson's correlation and logistic regression analyses were used to test for any association, correlation and prediction for risk of uncontrolled blood pressure.

The study was approved by the ethics committee of the university and authorised by the management of the Tamale Teaching Hospital, Tamale Central Hospital and Tamale West Hospital.

1.11 Structure of the thesis

This thesis is organised into five chapters with chapter one constituting the introduction which provided the background to the study. The chapter included the problem of the research, rational of the study, questions and objectives, significance of the study and scope of the thesis. It also discusses the framework for the study, relating how uncontrolled hypertension may be interconnected with various factors. The profile of the study area including its location, population size and distribution, diseases burden and health facilities were also presented in this chapter.

Chapter 2 presented the literature review to formulate the concept of the research. Chapter three discussed the methodology of the research, and presents the type of study design and the specific methods used. It explained the study site, study population, unit and inclusion criteria which were considered in gathering the data. In chapter four, the results of the analysis of the data collected were processed, and descriptive and inferential statistics made with regard to the results. Chapter five discussed the result obtained in relation to published work, and the final chapter, Six drew conclusion upon which recommendations were made.



CHAPTER II

LITERATURE REVIEW

2.1 Hypertension

Hypertension commonly known as high blood pressure (HBP) is defined according to the World Health Organization (WHO) criteria as blood pressure (BP) > 160/95 mmHg. The Joint National Committee 7 on Prevention, Evaluation, and Treatment (JNC7 US, 2004) also defines it as BP > 140mmHg for systolic pressure and 90 mmHg for diastolic pressure (Rafey, 2013). Hypertension is a non-communicable disease and it is one of the cardiovascular diseases known to be of medical and public health concern due to its high contribution to deaths in all populations (BeLue et al., 2009; Bonsa et al., 2014). The condition could arise from atherosclerosis, injury from trauma or hormonal problems resulting in narrowing of blood vessels. The condition of high blood pressure has been categorised into primary, secondary and anxiety or white-coat hypertension. Primary hypertension occurs in 90% of all cases of the condition, where there are no known causes compared with secondary hypertension, which is less frequent, with identifiable possible causes. Primary hypertension is a serious emerging endemic condition in sub-Saharan Africa (SSA) where growing industrialization and national development have been blamed for it. White coat hypertension has been described as raised blood pressure due to anxiety in an individual especially within the hospital environment or work surroundings (Pickering et al., 2008). Hypertension is a major cause of health problems, including heart disease, stroke or cerebrovascular accident and renal disease, incapacitation and economic drawback on the family and the entire population. It is a major contributor of death of about 9.4 million people every year, and it is expected to cause about 23.3 million adult deaths by 2030 (WHO, 2013), where about 85% will occur in the low and middle income



countries. It silently occurs in people unaware of them and therefore, known as ‘silent killer’. Lifestyle adoption or changes, such as, migration from rural to urban areas poses problem of rising blood pressure. A longitudinal study in Kenya has demonstrated that, migrants who adopted inappropriate lifestyle such as reduced physical activity, poor dietary habits, and increased levels of stress from poor standard of living, had significant increases in BP within a short time, (BeLue et al., 2009).

2.2 Risk factors of hypertension

Risk factors of hypertension are the factors that can immediately or potentially cause triggers or influence hypertension. These risk factors of hypertension have been identified as clinical risk factors (traditional risk factors) and sociocultural risk factors. Those risk factors such as high body lipids levels, diabetes and overweight which trigger or influence hypertension are termed traditional risk factors. Other traditional risk factors include individual constitutional built up, awareness of certain practices or habits and inappropriate use of medicines. These risk factors lead to the development not only of hypertension but, any of the cardiovascular diseases such as stroke, cardiac diseases and renal failures in general. Social practices that tend to trigger or influence the traditional risk factors to result into high blood pressure are known as sociocultural risk factors. Following is a narrative review of traditional and sociocultural risk factors.



2.2.1 Traditional risk factors

2.2.1.1 Lipids

Lipids are molecules that form part of the body tissues especially the adipose tissue which in excess, lead to the development of overweight or abdominal or visceral obesity that predisposes a person to one or more of metabolic syndrome diseases including high blood pressure (HBP) (Akpalu et al., 2011; Sakane et al, 2013; Alfada, 2014). The lipids from inappropriate diet serve as risk factor as a result of the excess calories they contain in the form of saturated fatty acids. Lipids in the body also form triglycerides, high density lipoproteins (HDL), low density lipoprotein (LDL) and cholesterol which have been associated with cardiovascular diseases, including hypertension (van Lennep et al., 2001; Reddy and Katan, 2004; Michal and Mozaffarian, 2010). Lipids consisting of saturated fatty acids (SFA) such as lauric, myristic or palmitic acid, which are from animal or plants and are risky to consume. Randomized Control Trials (RCTs) have established clear multiple effects of SFA consumption on circulating lipids and lipoproteins (Reddy and Katan, 2004; Michal and Mozaffarian, 2010). Compared with carbohydrates (CHO), SFA intake raises total cholesterol (TC) and LDL-C, but also lowers triglycerides and raises high-density lipoprotein cholesterol (HDL-C) (FAO, 2001; Michal and Mozaffarian, 2010; Eilat-Adar et al., 2013). TC: HDL-C ratio as a global risk marker indicates the best potential risk for chronic heart disease (CHD). In comparing CHO with SFA, taking SFA has no appreciable effects on TC: HDL-C ratio or Apolipoprotein B (apoB) levels but, raises Apolipoprotein A1 (apoA1) levels (Michal and Mozaffarian, 2010; Leon et al., 2013; Yeung et al., 2013). However, intake of polyunsaturated fatty acid (PUFA) or monounsaturated fatty acid (MUFA) in place of SFA lowers TC: HDL-C and Apo B levels (Reddy and Katan, 2004; Michal and Mozaffarian, 2010).



Meanwhile, intake of PUFA slightly lowers HDL-C and ApoA1 with little effects on triglycerides and lowering of TC: HDL-C ratio. Referring to trans-fatty acids (TFA), SFA consumption has little effect on LDL-C but raises HDL-C and lowers triglycerides and Apolipoprotein A1, with improvement in TC: HDL-C ratio (Reddy and Katan, 2004; FAO, 2010; Michal and Mozaffarian, 2010). It is therefore necessary to consider which component of lipid is being replaced for SFA in policy or guidelines for diet. Whilst replacing CHO for SFA produces minimal effects on lipids and Apolipoprotein levels, it is beneficial replacing PUFA and MUFA for SFA and harmful replacing TFA for SFA (FAO, 2010; Michal and Mozaffarian, 2010). Elevated total cholesterol and LDL levels are major risk factors for hypertension (van Lennep et al., 2001).

2.2.1.2 Overweight and obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health, (WHO, 2013). When energy food in particular is taken in excess with less physical activity, it leads to overweight (BMI>25kg), obesity (BMI>30kg) and diabetes though genetics, sex, family history and alcohol consumption cannot be ruled out (Reddy et al., 2004; Akpalu et al., 2011; Vijver et al., 2013). The inadequate intake of diet due to environmental and social changes with lack of insufficient physical activity, can lead to the problems of overweight and obesity. Adult obesity could have been a result of childhood obesity including tendencies of future hypertension. Urban areas of low and middle income countries are faced with undernutrition and overnutrition due to availability of low cost poor nutrient foods (Abanilla et al., 2011). Overweight or obesity is a potential risk factor for developing cardiovascular diseases (CVDs) such as hypertension, stroke, angina pectoris and myocardial infarction in adults (WHO, 2011; Vijver et al., 2013 and Alfadda, 2014). According to WHO (2010) more



than 40 million children under the age of five years in 2008 were overweight. Similarly, in 2008, more than 1.4 billion adults above 19 years were overweight of which over 200 million men and nearly 300 million women were obese with 35% of adults of the same age being overweight and 11% obese.

When body size was considered in terms of thigh circumference (TC), small thigh, as classified by Heitmann and Frederikson (2009) was shown to be associated with high risk of HBP (CVDs) and cardiac artery diseases (CADs). When these authors analysed TC for the two sexes together, there was a strong association of CVDs and CADs with TC, especially when TC was around or lower than 60cm (small TC). On gender categorization, men were more at risk of CVDs and CADs if TC was less than or equal to 56cm. For women, they were more at risk for CVDs or CADs if TC is 68cm or 60cm respectively (Heitmann and Frederikson, 2009). The conclusion was that the smaller the TC the higher the risk for CVDs and CADs. However, overweight and obese individuals may not be at risk of CVDs due probably to known endocrine effect of adipocytes secreting adipokines (adiponectins). According to Alfadda (2014) and Sakane et al (2013), excess fat accumulation leads to adipocytes dysregulation of the production of adiponectins in obesity, and visceral obesity has been linked with complications like hypertension and others including insulin resistance, diabetes, hyperlipidemia. In the Kjeldsen et al (2008) and Epkenyong et al (2012) studies, BMI showed an association with control of blood pressure status ($P < 0.001$). WC for both men and women was also associated with controlled and uncontrolled BP status ($P = 0.001$ and 0.002 respectively).



2.2.1.3 Diabetes

Diabetes is the inability of the body to take up sugar from the blood for use by the tissues. This may be as a result of inadequate amount of insulin produced by the body, the development of resistance of the body's insulin receptors to insulin or complete lack of the production of insulin by the body. If you have diabetes you are two to four times more likely to develop cardiovascular disease than people without diabetes (Costanzo et al., 2010 and World Heart Federation (WHF), 2015). Uncontrolled diabetes can cause damage to blood vessels leading to hypertension, heart attack, peripheral arterial disease, atherosclerosis or stroke. In complications of diabetes, the kidney may be deficient (nephropathy), which compromise the role of this organ as an important component in the renin-angiotensin-aldosterone system responsible for the maintenance of blood pressure.

Studies on demographic and epidemiological transitions as well as urbanization from the 1990s have established diabetes as one of the non-communicable disease (NCD) burdens in SSA as compared to the era before the 1990s when it was known to be a rare disease, (BeLue et al, 2009). WHO estimated diabetes in 2000 to be 177 million worldwide, and expected to reach 300 million by 2025. Presently, 10.4 million individuals are living with diabetes in SSA which is 4.2% of the global diabetes population. It is estimated that this figure will rise by 80% to reach 18.7 million by 2025 in this region with a higher prevalence in the urban areas. It is also projected to reach 23.9 million by 2030 in Africa (Hall, 2011). There are indications from studies that rapid urbanization accompanying ageing population leads the increasing prevalence of diabetes in SSA (Danquah et al., 2012; Akins et al., 2010). WHO estimated diabetes in 2000 to be 177 million people worldwide, and expected to reach 300 million by 2025. Presently, there are a yearly deaths of 4 million (9%) due to cardiovascular complications (CVCs). Type 2 diabetes is the most prevalent type 1 diabetes all over the world including SSA.



The very important modifiable risk factor for Type 2 diabetes is overweight or obesity. People with Type 2 diabetes have high rates of cholesterol and triglyceride abnormalities, obesity, and high blood pressure, any of which can be a major contributor to a higher rate of cardiovascular disease. High blood pressure has been identified as an important component of metabolic syndrome (MetS), which is determined as, the presence of any three of the following conditions: abdominal obesity, elevated fasting levels of triglycerides, low levels of fasting HDL-C, or "good," cholesterol, high blood pressure, and high fasting blood glucose levels (Mathieu et al., 2006; Kjeldsen et al 2008; CDC, 2012). Mathieu et al. (2006) and Akpalu et al (2011) have also demonstrated that hypertension and hyperglycaemia were two components of MetS strongly associated to CVDs.

2.2.1.4 Inadequate diet

An adequate, healthy diet must satisfy the basic human needs of energy and all essential nutrients (FAO, 2008). Therefore, inadequate diet would be the intake of food that is deficient or is too much in the nutrients required to meet the body's needs. Food habits, where there is overnutrition, without exercise, and undernutrition are risk for consequences such as build up of excess body lipids like LDL-C, overweight, diabetes, and cardiovascular diseases including hypertension. Inadequate dieting may involve taking inappropriate nutrients such as excess sodium, lipids and insufficient vitamin D, which have all been associated with CVDs (Min, 2013 and Vijver, et al., 2013). Reduced salt intake has effects of reducing left ventricular hypertension, stroke and high blood pressure (Reddy and Katan, 2004 and Vijver et al., 2013). Africans commonly use salt to preserve food such as fish, and adding salt to prepared food for taste. A study by van d-Vijver et al. (2013) stated that, in Tanzania, low sodium diet intake,



reduced blood pressure in normotensives in four to five days, while in Kenya replacement of sodium with potassium in newly established hypertensives reduced blood pressure level comparable to patients kept on diuretics (van d-Vijver et al., 2013).

The consumption of fruits and vegetables has been low among the developed world with the low consumption seen with increasing age and decreasing income. Within the low and middle income countries including Ghana, consumption was as low as 36.6% for men and 38.0% for women, where in a country like Pakistan, it was 99.2% for men and 99.3% for women, (Hall et al., 2009). Consumption of fruits and vegetables has the benefit of reducing risk of hypertension.

According to the report by Vijver (2013), a recommended daily intake of potassium is 90 mmol, while sufficient intake of fruits and vegetables is defined as five or more servings of fruits or vegetables for a typical day from (STEPS survey report -date). Enough potassium is not the only benefit that one may derive from eaten fruits and vegetable but, also the supply of antioxidants which are important in neutralizing free fatty acids radicals and reducing the risk of CAD (WHO, 2014; Eilat-Adar et al., 2013). Mediterranean diet and diets with high fish (Spain diet) have been associated with reduced risk of high blood pressure, markers of vascular inflammation, CVDs and coronary heart disease (CHD) (Kris-Ertherton et al., 2002; Dontas et al., 2007). These diets contain not only MUFA and PUFA like omega-3 and PUFA-6 but, other nutrients like beta-carotene, vitamin C and E that protect against atherosclerosis from lipid oxidation and thrombosis through lowering of LDL-C and triglycerides which promotes endothelial functioning. While excess sodium intake can lead to hypertension, vitamin D deficiency could provoke endothelial dysfunctioning when rennin-angiotensin is disrupted. It has been recognized that deficiency of Vitamin D can be influenced by multiple variables,



including race, geographical latitude, environment, lifestyle, and genetics, with the risk of CVDs increasing with increasing distance from the equator, (Min, 2013).

2.2.1.5 Physical inactivity

Physical exercise improves muscular function and strength, and the ability of the body to take in, circulate and use sufficient oxygen that has the benefit of reducing fatigue or stress (CDC, 2010; De Biase, 2013). Physical activity level could be sedentary or vigorous in the form of exercise (FAO, 2001; Stamatakis et al., 2011). Exercise could be done brisk, moderate and vigorous to maintain, improve or treat a health situation. Exercising for 30 to 60 minutes daily by brisk walking, trotting, bicycle riding, and skipping for instance, for at least three days a week has been demonstrated to be important in maintaining a healthy lifestyle (Department of Health-New York State, 1999; Prasad and Das, 2009; FAO, 2004; Calhoun et al., 2008; Shiroma and Lee, 2010). It is known that when exercising less than 30 minutes 5 times a week as in moderate activity and 20 minutes 5 times a week as in vigorous activity then, one is performing inadequate physical activity. The fourth leading risk factor for mortality is reported to be inadequate physical activity causing about 3.2 million deaths and 32.1 million (2.1% global) disability-adjusted life years (DALYs) each year, (Mendis et al., 2011 and WHO, 2011). Furthermore, insufficient physical activity has a risk of 20% to 30% increased risk of all-cause of mortality compared to those who engage in 30 minutes moderate physical activity most days of the week. Benefits of exercise include increase in exercise tolerance, reduction in body weight, reduction in bad (LDL and total) cholesterol and increase in good (HDL) cholesterol all of which have the effect of reducing blood pressure (Myers, 2003).



Sitting or patronising screen-based entertainment (watching TV, computer or video games) for long hours without exercise is said to predispose individuals to risk of CVDs. Apart from the unhealthy effect of TV viewing, another study has shown that, there is impairment of metabolic activity as a result of reduction in lipoprotein lipase activity due to prolong sitting as compared to standing up or ambulating (Stamatakis et al., 2011; Grøntved and Hu, 2011). Published reports consistently suggest that excessive sedentary behaviour might be linked to increased risk for obesity, dyslipidemia, plasma glucose levels, and metabolic syndrome independently of moderate-to-vigorous physical activity participation, (Stamatakis et al., 2011).

However, it is always advisable to do appropriate exercise under the professional prescription whether in a healthy or sick condition. Physical activity improves endothelial function both in healthy subjects and in patients with CVD through several favourable effects on inflammation and regulation of autonomic tone and blood pressure, in which endothelial progenitor cell number and function are inversely correlated with age and common cardiovascular risk factors like hypertension, diabetes, smoking and hyperlipidemia (De Biase, 2013).

2.2.1.6 Tobacco smoking

Substance use disorders and cardiovascular disease (CVD) are often comorbid. Tobacco smoking is a risk factor for high blood pressure and probably its control, heart failure, ischemic stroke, chronic heart disease, and acute myocardial infarction (Ambrose and Barua, 2004; Schane et al., 2010; Basu et al., 2013).

Tobacco use whether smoking or chewing is known to damage blood vessels, could raise blood pressure, decrease the amount of blood carrying oxygen to tissues and tend to influence blood clogging (CDC, 2010; Inoue, 2004). Studies on nicotine, carbon monoxide (CO) and oxidizing



gases in cigarette smoke have demonstrated an important cigarette potential to the development of CVD, and other works have established the contributions of polycyclic aromatic hydrocarbons (PAHs), particulate matter, and other constituents of tobacco smoke to the pathophysiology of CVD including atherogenesis (CDC, 2010; Inoue, 2004). Nicotine increases blood pressure and myocardial contractility increasing demand for oxygen by stimulation of the sympathetic nervous system and the heart (CDC, 2010). Amount of oxygen release by haemoglobin is reduced with low level of carriage of oxygen when CO binds avidly to haemoglobin. Smoking cigarette influences other cardiovascular risk factors, such as glucose intolerance and low serum levels of high-density lipoprotein cholesterol (Ambrose and Barua, 2004 and CDC, 2010). Cigarette smoking is responsible for one-tenth of causes of CVDs worldwide that leads to a yearly loss of 6 million lives, projected to reach 8 million by 2030 (World Heart Federation, 2013). Use of tobacco remains one of the most serious epidemiological risk factors in terms of prevalence of coronary artery disease. Smoking also increases the risk of peripheral vascular diseases. Second-hand smoking by non-smokers is estimated to be between 25–30%, which increases the risk of developing a CVD (CDC, 2010; World Heart Federation, 2013). The use of tobacco varies in the African countries, ranging from 8 to about 27%. However, in Ghana, studies revealed that values vary with 6.2% (from 3.8-9.7%) as an average value, and other prevalence values of 8.8%, 10.8% (Pampel et al., 2008; Owusu-Dabo et al., 2009).

2.2.1.7 Alcohol consumption

Consuming alcohol moderately is beneficial for metabolic activities but, when it is consumed excessively it has the tendency of increasing weight and other associated accidents (Giuseppe



et al., 2008; Costanzo et al., 2010; Eilat-Adar et al., 2013). Alcohol consumption is also correlated with increased risk for glucose intolerance (GI) and diabetes, which have been shown to be associated with high blood pressure (Leon et al., 2013; and Thawornchaisit et al., 2013). Alcohol which could be converted to fatty acids can influence fat tissue development that can lead to overweight or obesity posing risk for heart and blood vessel diseases (Leon et al., 2013). Risk of intoxication and development of CVDs from alcohol intake is highly individualistic and defined by genetics, age, sex and family history. Excess consumption above sensible levels of one to two ounces (28.349g) for men and one ounce (10g) for non-pregnant women a day exposes one to weight gain and CVDs like HPT, apart from other risks such as accidents (Puddey and Beilin, 2006; Calhoun et al., 2008 and Costanzo et al., 2010). Alcohol consumption has direct effect of a linear increase of blood pressure particularly, chronic drinkers, who experience a prolong impact (Yeungei et al., 2013 and Costanzo et al., 2010). In a study of heavy drinkers (≥ 40 g of alcohol a day), heavy drinking was more associated with increase in BP, where BPs of 40% of the heavy drinkers were 17.6mmHg greater in systolic pressure and 10.9mmHg greater in diastolic pressure than light drinkers, (Puddey and Beilin, 2006; WHO, 2013). History of patients smoking cigarette and excess consumption of alcohol, have been identified as some factors that contribute to uncontrolled blood pressures, (Goverwa et al., 2012). Leon et al (2013) and Yeung et al (2013) reported that among working-age men, heavy and hazardous drinking was associated with elevated levels of B-type natriuretic peptide (BNP) in two population-based cross-sectional studies in Russia. This was the first time this association was systematically investigated and shown to display dose–response effects overall. BNP levels increase primarily in response to abnormal cardiac chamber wall stretch which can occur both as a result of atherosclerosis as well as due to other types of damage to the myocardium (Leon et al., 2013). Further studies on the risk of CVDs associated with alcohol



consumption showed evidence from randomized controlled trials (RCTs) suggesting that alcohol monotonically increases blood pressure, HDL-C and triglycerides (Yeung et al., 2013). In examining the association of alcohol use (10 g ethanol/day) with CVD risk factors (blood pressure, lipids and glucose) and morbidity (self-reported IHD and CVD) among men in the Guangzhou Biobank Cohort study, these authors stated that observed U shape association between alcohol consumption with health, where moderate intake (1-2 drinks per week) of alcohol protects against CVDs and is negatively associated with ischaemic heart disease and stroke. Studies by Kjeldsen (2008) indicated 8.4% patients with uncontrolled BP had a history of consuming three glasses of alcohol per day. This consumption of alcohol was shown to be significantly associated with status of BP ($P = 0.018$).

2.2.1.8 Family History

There have been studies that confirm associations between family history and risk of hypertension and CVDs. A family history of stroke or coronary disease, which is associated with hypertension, before age 55 years for men and 65 years for women showed that, one being a first-degree blood relative is at risk of cardiovascular disease (Khatib and El-Guindy, 2005; WHO, 2013; WHF, 2015). In analysing the incidence of cardiovascular diseases, Paynter et al. (2010) noted that family history as a risk for cardiovascular disease integrates not only shared genetic makeup of the individual, but also shared behaviours and environmental factors.

Members within a family always have genetic similarities, and these genes express their physical and physiological functions as an outcome of interaction of the body's pool of genes with the environment. Studies have revealed that some loci of genes have the tendencies of exhibiting and expressing CVDs risk, such as rise in cholesterol, coronary heart disease and



stroke in middle age people (Paynter et al., 2010). Polymorphisms in the apolipoprotein E gene (APOE) cause on average 10% rise in cholesterol concentration compared with homozygosity for E3 (Lopes et al., 2007; Zende et al., 2013). A defect in allele of the apolipoprotein B gene (APOB) has a heterogeneous effect on cholesterol. Metabolic syndrome (MetS) could lead to rise in arterial stiffness, which is associated with hypertension (Quareshi, et al., 2012; Phababpha et al., 2013; Won et al., 2013).

2.2.1.9 Age and sex

There have been reports that, hypertension levels increase with increasing age. According to study, with age-adjusted above 65 years, measured incidence of increase in blood pressure (\geq 140/90mmHg) while even on medication, was from 36.4-50.0% in West Africa. The rise in hypertensive cases was then steeper in women than in men with an average of 0.7 mmHg and 0.4 mmHg respectively rates of increase yearly (Cappuccio et al., 2004; Mancia et al., 2008). At the same age of 80 years and above the increases is about 10-20 mmHg higher in women than in men. As blood pressure (BP) tends to increase with age, hypertension is becoming exceedingly common in the elderly with an estimated prevalence of 67% for adults aged 60 years or older, and in adults aged 55 to 65 the lifetime risk of developing hypertension is estimated to be 90%, in the USA (Denker and Cohen, 2013). In adults older than 35 years vascular risk factor is greater than one (>1), and before age 50 most people having hypertension experience elevated diastolic blood pressure. Meanwhile, diastolic BP tends to fall whiles systolic BP rises or increases after age 50 or 60 and increase the risk of cardiovascular events (Denker and cohen, 2013).



Due to the build-up of plaque in heart arteries from childhood adults are at risk of high blood pressure (Christoffersen et al., 2013). This was the first prospective study to show that looking old for your age is a marker of poor cardiovascular health including raised blood pressure and hence its control.

2.2.1.10 Vascular inflammation

Vascular inflammation occurs as a response to injury, lipid peroxidation, and in infectious circumstances in which hypertension and its associated risk factors are amplified by these harmful effects (CDC, 2010; Ambrose and Barua, 2004; Koopman et al., 2012). The authors showed epidemiological and clinical evidence, that were consistent with a link between markers of inflammation and risk of future cardiovascular events. The studies revealed that inflammation plays a role in all stages of atherothrombosis, which involves rising levels of biomarkers like dyslipidaemia (LDL-C), cytokine IL6 and C-reactive protein (CRP). In an acute, chronic condition of infection and also smoking, overweight and obesity, the inflammation that may result normally leads to atherosclerosis. Atherosclerotic conditions show dysregulation of lipids from dyslipidemia which leads to high level of LDL-C and narrowing of blood vessels, and the risk of high blood pressure. The LMICs are determined to develop through globalization and urbanization which are associated with migration from rural to urban areas, where social life styles changes related to dietary transition and other life style risk behaviours that normally lead to hypertension and CVDs (Koopman et al., 2012). Due to poverty LMICs in Africa like Ghana are battling with the burden of communicable diseases such as malaria, HIVAIDS, Tuberculosis and poor environments (van d-Vijver et al., 2013). As further stated, their inability to prevent and control the levels of infectious diseases promote



the occurrence of biomarkers of inflammation which consequences lead to hypertension and CVDs.

2.2.1.11 Psychological stress

Understanding how psychological factor affect physical health and being sensitive to these factors can make an important difference in health outcomes, including those of the cardiovascular system. Currently, there is convincing evidence that psychosocial factors greatly contribute to the pathogenesis and expression of hypertension (Lang et al., 2012 and Aikins et al., 2012). A psychosocial factor may be defined as a measurement that potentially relates psychological phenomena to the social environment and to pathophysiologic changes, (Hemingway et al., 1999 and Dressler, 2004). Psychosocial factors could act singly or combine in clusters and exert effects at different stages in the course of life. The evidence consist of data relating HPT risk to 5 specific psychosocial domains including depression; anxiety; personality factors and character traits; social isolation, and chronic life stress where pathophysiological mechanisms underlying the relationship between these entities and HPT can be divided into behavioural and direct pathophysiological mechanisms (Alan Rozanski et al., 1999). In behavioural mechanisms, psychosocial conditions contribute to a greater frequency of adverse health behaviors, like poor diet, smoking and alcohol consumption, whereas in direct pathophysiological mechanisms, it is neuroendocrine and platelet activation (Alan Rozanski et al, 1999). Psychosocial factors may influence health directly through neuroendocrine mechanisms or indirectly through their unhealthy behaviour (Macleod et al., 2001). Personality type and factors play greater role in handling one's psychological stress, which is a reaction to a situation of behaviour to emotional state of anger and anxiety, among others. The tendency to develop CVDs depends on one's preparedness and management techniques at the mental level



at a given moment. Hypertension, myocardial infarction and heart attack have long been identified as some consequence of stress. According to Merz et al. (2002), the personality type characterised by hard pronounced impatience, correlates well with increases in blood pressure, cardiac reactivity, blood cholesterol, and cigarette smoking, as well as poorer diet and poor exercise habits.

The exact epidemiology of cardiovascular diseases in SSA is unclear, (Macumbi, 2012). Research into the determinants of cardiovascular diseases in this region of the world must go beyond the conventional risk factors, and attempt at understanding the role of local practices and cultural habits in determining the incidence of the conditions.

2.2.2 Socio-cultural risk factors

With the integration and modernization of cultures all over the world, the standard of living and lifestyle in many sub-Saharan African countries, particularly in urban areas, resembles those of many western countries, with related epidemiological changes, (Kengne et al., 2005). Sociocultural risk factors are those factors that relate to practices from a given society and include practices such as religious belief, health healing and food habits. Adoption of risky life styles as a result of transformations leading to urbanization and globalization, and also dietary transitions contribute to increased risks of hypertension. The following discusses sociocultural ramifications on the development and control of hypertension.

Culture ‘refers to integrated patterns of human behaviour that include the language, thoughts, actions, customs, beliefs and institutions of racial, ethnic, social, or religious groups’, (California Endowment, 2003). Furthermore, Dressler (2004) stated that culture is, “the knowledge that one must possess to function adequately in society, but it incorporates as well



recent insights from cognitive science”. Following are various cultural practices which narrate factors that affect the control of hypertension in this study.

2.2.2.1. Health systems

Any culture has a system of health beliefs to explain what causes illness, who should be involved in the process and how it can be cured or treated. Different racial and ethnic groups have diverse beliefs and attitudes about health and medicines. Ghana has more than 50 ethnic groups with related sociocultural practices (Traditional practices) which are infused with the cultural system of the western world that result in a multisystem or pluralistic system of health practice. Each of these cultures has health practices that have their beliefs and knowledge handed over from one generation to the other generating a way of addressing the health needs of their people. All groups believe in supernatural forces, use herbs and the spiritual means in health practices. The existence of pluralistic health system and practices help address health problems including hypertension, in the way they understand it (BeLue et al., 2009; Goverwa et al., 2012; Foote, 2009). Based on these understandings, these cultures interpret these diseases, albeit not completely in the manner acceptable by the orthodox healing systems. With the availability of traditional health, there is proliferation healershopping, where patients move from one health practice to another to acquire satisfaction to their physical and psychological needs. According to Aikins (2010), "chronic diseases have the effect of causing impoverished individuals and families that draws them into a state of downward spiral where the disease worsens”. This has a trickle down effect of promoting healer-shopping for the range of medical systems that provide care for chronic diseases. This has been reported to have its medical complications especially for chronic diseases like hypertension (Aikins et al, 2010).



In Ghana traditional healers have been incorporated as providers into their National Healthcare Delivery System. Traditional and faith healers are always sought after to care for diabetics and hypertensives with the possible outcomes such as stroke (BeLue et al., 2009; Goverwa et al., 2012; Foote, 1999). Patients have admitted in a study to taking traditional herbs in the treatment of hypertension, where majority confirmed consulting faith healers before the scheduled time to visit a health facility (Goverwa et al., 2012). The Traditionalists merely interpret situations of diseases as punishment by a superior God or gods, for sins committed.

Nowadays, the emergence of other religions like Christianity and Islam, have come with orthodox medicine and other spiritual means of addressing health problems. They provide both physical and spiritual needs for their congregation and other members of the society at large. As reported by Abanilla et al (2011), all church leaders and health committee members were unanimous in their belief that their churches had a duty to address the spiritual and physical needs of their members through effective health education health screening and health-related activities in addressing their congregations about lifestyle practices (i.e. exercise programmes or counselling) to reduce stress and for promoting cardiovascular health. This poses a problem of inadequate management of CVDs and its risk factors resulting from inadequate knowledge by the traditional practitioners. Patients therefore present health conditions at times when the disease has progressed to a stage where it is difficult to be managed at an appropriate health facility (Key informants, 2014).

2.2.2.2 Family decisions

The practice of family systems especially the extended family system has been in existence and well known among the various ethnic groups in Ghana. Decisions are always taken by heads of family with regard to situations of illness and its interpretation. This may affect attention that



may be needed to prevent a further worsening if not complicating the state of the health condition. Again each community or ethnic group has a language that can arouse emotions or social implications that can have psychological stress leading to risk such as anxiety, depression, high BP (Lang et al., 2012; Atiemo, 2013). This could happen between spouses, within the extended family or at the level of the wider community. In Ghanaian societies, a person could be provoked by asking him or her to ‘give birth’, or child refused to being sent by an adult because he or she is not married at an age regarded as the marital age. Ghanaian societies therefore, regard and accept marriage as a sign of social responsibility and higher societal status within the various social ethnic groups (Salm and Falola 2002; Franceour and Noonan 2004; and Atiemo, 2013). Among typical health practices by Dagombas, there is fear of complication or death from injection if a patient has a boil which has not been naturally opened up. It is therefore a family decision to send a patient with such an infection to the hospital or not. There are similar instances where family beliefs have precluded patients from obtaining appropriate treatment for chronic conditions, including HPT due to misinterpretation linking disease to other causes like spiritual underpinnings (Aikins et al., 2012b; Aikins et al., 2010).

2.2.2.3 Lifestyles changes

Lifestyle is defined as the accumulation of material goods and the adoption of related behaviours that signify having been a success in life in terms of the standards of the community (Dressler, 2004). Housing and other business activities are made so comfortable, and require less physical exercise, predisposing people in the urban areas to being overweight and obese, compared with those living in rural places (BeLue et al., 2009; Aikins, 2010b). With the opportunity of developed technology, travelling is made so easy with the use of vehicles, unlike



in the past where the conduct of daily business activities depended on foot. Watching TV and exploring the internet over long hours without enough exercise have the tendency to increase weight that has been reported among urban dwellers (Stamatakis et al., 2011).

Life style changes also permeate in occupational choices which have seen many people taken up jobs that limit them to taking inadequate diet and without appropriate physical fitness practices (Lang et al., 2012 and Abanilla et al., 2011). The resulting stress from culminating overweight, obesity and less physical exercise have the consequence of cardiovascular diseases. Culture strongly determines the type of food that is eaten by a group of people and the way they use these foods to celebrate festivals and funerals. However, the increased consumption of poor diets that are high in fat and processed foods or nutrients in countries like Ghana, Cameroon, The Gambia, Kenya, Senegal and Tanzania are more strongly associated with globalization, urbanization and westernisation (Aikins, 2010b). The intake of these poor diets are associated with the development of factors that have the risk of overweight and obesity which are some of the conditions that challenge the control of hypertension.

Many African societies see overweight or obesity as plump associated with being wealthy, healthy, and beautiful. Research showed that, 'in Ghana female obesity is linked to multiple child births and the obesogenic period of breastfeeding, when women attempt to resist-cultural pressure to eat fatty foods and avoid strenuous activity, including exercise (Dake, 2012; Aikins, 2010b; Dake et al., 2010). Socio-cultural understanding of risk factors for chronic diseases (CD) is increasing and including diet and food eating practices like salted meat as major risk factors for the large spectrum of CDs (Aikins, 2010b). There are beliefs in Ghanaian cultures regarding health practices that lead to avoiding, omitting, introducing or increasing food nutrient in order to correct or treat a disease or condition such as, diabetes and hypertension (beLue et al., 2009; Insoll, 2011; Kankpeyeng et al., 2011; Aikins et al., 2012b).



Life style choices are known to affect the level of exercise embarked on by individuals, and also the concepts of exercise is known to differ across cultures and societies (Aikins et al., 2010). It is observed that rural farmers engage in strenuous physical activity as part of farming activities in a similar manner to the daily activities by informal worker like mechanics, street hawkers and domestic servants in urban areas (Aikins, 2010b; Akins et al., 2012). However, among some professionals like bankers and other occupations requiring sitting for long hours there is less engagement in physical exercises, predisposing them to risk factors to CVDs.

Smoking and alcohol consumption are well described life style changes that have a very strong societal influence, where overconsumption is seen as a predominantly male problem (Pampel, 2008; Chow et al., 2009; Owusu-Dabo et al., 2009). Most African societies culturally discourage and prohibit women from smoking and drinking, and if it occurs it may be secret (Pampel, 2008; Owusu-Dabo et al., 2009; Koopman et al. 2012). In some instances smoking and drinking are initially habits adopted from the surrounding environment either from childhood or adulthood that are socially acceptable, though some people do know the harmful consequences of smoking and drinking.

2.2.2.4 Social risk factors

According to Dressler (2004) by Goodenough WH definition of being social, is interacting successfully with others in various contexts. Social effects exist when there are interactions at the many levels of the society that begin from individuals within a family, to community, nation and the various geographical areas in the world as a whole (Dressler, 2004 and Akins, et al., 2010). The relationships among the communities, nations and the world at large are not static however, but transform the society and social systems which according to Lang et al



(2012) have consequences of psychological stress that may be connected to development of cardiovascular conditions like hypertension and atherosclerosis.

As defined by Lang et al. (2012), ‘social determinants of health can be understood as the social conditions in which individuals live and work, where these conditions are shaped by the power, income and other resources, within the community, nation, and world level at large.

Social factors being risks of hypertension have a number of interrelated factors such as work and its conditions, educational level, various social network support systems, the use of communication network and social policies (Lang et al., 2012). These do not influence the intermediate risk factors as psychological stress diabetes, obesity and hyperlipidaemia to hypertension alone but, can also negatively affect the management and outcome of hypertension.

Work and occupation are linked on the bases that so far as you work you developed an occupation. Overworking, underemployment, unsatisfactory working conditions and out of job or job instability are factors that exposes people to circumstances of both psychological and social stresses. Lang et al. (2012) and Havranek et al. (2015) reported that, work related consequences of stress like lower social status, high workload, casual workers, instable jobs, social isolation, occupation and underemployment result in hypertension, coronary heart disease (CHD) and atherosclerosis.

Communication network are media factors that many individuals, families, peer groups and marketing personnel use to transfer information to their targeted audience either intentionally or unintentionally to increase their business activity. Tobacco smoking and alcohol consumption habits that have the tendency of promoting or worsening health conditions such as hypertension, diabetes and obesity, may often be built through transfer of inappropriate knowledge to customers. Particularly, nowadays, both professionals and non-professionals



market their services and medicines and herbal products through the media which are accessed by customers without proper guidance as to how they should be consumed (Aikins et al., 2010). Religious practices are spiritual and social undertakings that use citations and in some instances including music, to pacify and satisfy a worship process. African theories on illness are generally large, and its traditional medicine and religion are intricately merged and cannot be separated, (Aikins, 2010b; Kanpkeyeng et al., 2011; Insoll, 2011). Theology in African perspective tries to explain illness and disease, and also tries to establish a relationship between the individual, the universe and God. Many Traditional leaders are also religious leaders, and at the same time healers. The practice of traditional African medicine considers social and psychological factors in order to understand patient and disease. According to Kankpeyeng et al. (2011), the science of medicine refers to the art of understanding a patient's disease. Believe in Supernatural force, other spiritual and social forces that influence man, the family and the society acceptance as whole has been discussed as knowledge, spiritual and expected attitude that have passed on from generations which have effects on anxiety, stress, emotions and spiritual bases of response to treatment of hypertension and other chronic diseases (Aikins et al., 2010; Norman, 2014; Kretchy, et al., 2013).

Music is a combination or resonance of sounds emitted from instruments and provides psychological satisfaction and happiness that helps to reduce stress. Some African spiritual traditional healers use sounds from knocks of modeled sticks or metal, whistle or song from the healer to invite the healing interpretations and powers to heal their patients. Christians in their healing process drum and sing songs of praise to God to allow His healing powers descend to heal the sick. Therefore although, music is perceived as an entertainment, it also further contributes to the release of stress, improve psychological and social states. It also improves relations by incantations and invoking the spirits to prevent and heal illnesses such as high



blood pressure and diabetes (Aikins et al., 2012b), though noted to be managed well by biomedical means.

2.2.2.5 Socioeconomic transformation (Urbanization)

The theoretical framework of Weber illustrates that, there are three determining factors in social hierarchical class, and that, they are related to the ownership and control of material resources related to the ability to access cultural, social and knowledge resources and power, as in the political context (Weber, 1958). Resources within virtually all human societies are unequally distributed (Havranek et al., 2015). Occupation, income and education are commonly used indicators of socioeconomic status for individual, household and neighbourhoods (Lang et al., 2012; WFP, 2012; Havranek et al., 2015). Globalization was defined by Chapman (2009) as, a process characterized by the growing interdependence of the world's people, involves the integration of economies, culture, technologies, and governance. Globalization is reported to have contributed to several positive outcomes like increased access to technology, but also resulted in increased gaps between rich and poor, causing migration to urban centres and also decreasing physical activity. The consequences of this are clearly the development of chronic diseases including hypertension (Dressler, 2004; BeLue et al., 2009; and Danquah et al., 2012). Every community or ethnic group in Ghana exists in a culture with available resources that reflect their economic state. Members within a culture are depicted by an individual or family and in most Ghanaian societies for instance, an individual or family perceived to be wealthy should be seen to be taking “good diet”. This diet does not necessarily have to be adequate but should be physically presentable with plenty of meat and some amount of fat or oil. This kind of diet that predispose one to overweight or obesity are clear risk to the development of



hypertension which are unfortunately promoted due to limited knowledge about CVDs and their risks (Aikins et al., 2010 and Akins, 2010b).

Socioeconomic stratification has previously been consistently associated with differences in prevalence of cardiovascular risk factors, incidence of CVDs and mortality across populations. These factors were originally more common in upper socioeconomic groups in the developed world, but the patterns have reversed over the last 50 years, (Mendis et al., 2011). Governments, metropolis and municipalities from LIC including Ghana are not able to meet the needs to plan and support deficiencies in infrastructure, public services and health behaviour change promotions (Mendis et al., 2011 and Aikins, 2007a). Healthy behaviours require healthy food and diet choices, suitable environment for lifestyle change and development of needed physical habitual activity. It is reported to also include avoidance of air pollutants (including tobacco smoke), and ensuring appropriate consumption of alcohol (Mendis et al., 2011; WHO, 2013; Chow et al., 2009). Due to the fast and unplanned urbanization of our societies, healthy lifestyle habits and practices are not also in line with healthy planned behaviours. These circumstances result in health behaviours and life styles that expose individuals to the risks of CVDs (Chow et al., 2009; Aikins, 2010b; Mendis et al., 2011.). Although, in the big cities like Accra, Kumasi and Tamale, there are a number of fitness centres, football clubs and clubs for other games that offer services to people, only limited segments of society who actually develop the habits of or wanting to keep fit accessed these facilities (Aikins et al., 2010). Most of the LMICs are faced with compounded weak health systems that are unable to cope with the double burden of infectious and chronic diseases. The traditional and non-western African population seldom develops CVD even during promoted inflammation, as they have low prevalence of lifestyle-related cardiovascular risk factors compared to American and European societies (Koopman et al., 2012).



2.3 Control of hypertension

Many methods have been developed to be used either solely or in a combination with other methods for the effective control of established hypertension in an individual's patient. These methods have been distinguished as non pharmacological and pharmacological, and are supported by national policy guidelines.

2.3.1 Non pharmacological

In a situation where hypertension is controlled without the use of drugs, but with other means like exercise, type of diet and avoidance of the use of tobacco or alcohol, it is described as non pharmacological means. Although, a single means from the numerous means controlling BP, when practiced appropriately can help control hypertension, practicing more than one means at the same time has been shown to be beneficial in the optimal control of high blood pressure (HBP) (Viera and Hinderliter, 2009; Mackenze and Macdonald, 2010; Almas, 2012).

Adequate diet which is recognized as the presence of the required (nutrients) in the diet for hypertensive is necessary to control hypertension or maintain a healthy state. To ensure good control of hypertension it has been shown that patients benefit from low salt diet, enhanced vitamin D, potassium supplementation through the consumption of vegetables and fruits (WHO, 2014; Min, 2013; Vijver et al., 2013). Whilst the right level of vitamin D in the body maintains hormonal rennin-angiotensin mechanism, requisite salt intake avoids retention of excess water in the body. According to Vijver et al (2013), low sodium diet intake in Tanzania led to its urinary secretion of 52 mmols of sodium per day, reduced blood pressure in normotensives in four to five days, while in Kenya supplementation with potassium in newly established hypertensives reduced blood pressure level comparable to patients who were kept



on diuretics. Min (2013) reported that, vitamin D deficiency could result in vascular endothelial dysfunctioning manifesting as high blood pressure when rennin-angiotensin is disrupted.

Reducing the consumption of saturated fatty acids is a strong international dietary recommendation aimed at controlling hypertension (FAO, 2010; Reddy and Katan, 2004; Michal and Mozaffarian, 2010). The World Health Organization and the US Dietary Guidelines recommend that for maintaining good health, including control of cardiovascular diseases, less than 10% of the total energy intake should be from SFA. This amount is even lower in the opinion of the American Heart Association, who recommended less than 7% (Michal and Mozaffarian, 2010).

HPT has been reported to be effectively managed by limiting the consumption of energy foods containing sugars, whilst encouraging the eating of fruits, vegetables, legumes, whole grains, and also engaging in regular physical activity (FAO, 2008). Regular physical activity is defined to be engaging in a 150 minutes brisk walk per week for adults (FAO, 2001; Reddy and Katan, 2004; Akpalu et al., 2012; and Vijver et al., 2013).

Adequate knowledge about HPT, high level of its awareness, and also good appreciation of the disease consequences, which can be acquired through public health educational campaigns have been shown to positively influence the control of the disease (Aikins et al., 2012a). Public education has been shown to be effectively promoted by both government and the private sector, either by working separately or collaboratively in terms of finances and human resource.

2.3.2 Pharmacological

Traditionally, HPT has been successfully managed with drugs from the pharmacological groupings including the thiazides (Bendrofluazides); angiotensin-converting enzyme



modulators (Lisinopril, Lorsatan); centrally acting alpha agonist (Methyldopa, Clonidine); peripherally acting alpha antagonist (Terazosin, Prazosin) (Ogihara et al., 2009; Viera and Hinderliter, 2009; Bonaccorsi et al., 1973). These drug substances target different physiological and molecular mechanisms involved in the diseases development process. The drugs are used either as single agents or in combinations whilst non-pharmacological approaches are also encouraged. The most influencing factor in the control of hypertension here is the individual's willingness and readiness to comply with the prescribed orders by the specialist or qualified professional. According to WHO (2003), compliance is, 'the extent to which a person's behaviour of taking medication, following a diet, and or executing lifestyle changes, corresponds with agreed recommendations from a health care provider'. Taking the drug at the right dosage and time is important to help control hypertension. However, a number of factors have been identified that poses challenges to the strict compliance of patients with agents prescribed for the control of HPT, such as side effects, have been identified.

Adverse reactions, otherwise referred to as side effects have been noted as an important factor that affect compliance. Normally, initial introduction of calcium channel blockers for treatment causes headaches, palpitations, hot flushes, eodema and constipation (Ogihara et al., 2009; Joshi et al., 2010). Angiotensin-receptor blockers (ARB) will cause hyperkalaemia, just as Angiotensin-converting enzyme (ACE) inhibitors. ACEs however also have dry cough and dyspnoea as adverse effects. Thiazide diuretics and their analogues may cause hypokalaemia, hyperurecaemia and impaired glucose tolerance, for which reason they are not quickly prescribed (Ogihara et al., 2009; Joshi et al., 2010). β -Blockingantihypertesives ($\alpha\beta$ -blocker) affects glucose and lipid metabolism when used alone or when combined with diuretics. α -blockingantihypertesives cause palpitation and dizziness (Ogihara et al., 2009; Fishman and Sica, 2011). Whilst centrally acting sympatholytic drugs effects sleeplessness, thirst, malaise



and impotence, peripheral acting sympatholytic drugs cause depression, gastric ulcer and Parkinsonian syndrome (Ogihara et al., 2009). Vasodilators (such as minoxidil) are another antihypertensives that produces headache, eodema, palpitation and tachycardia as side effects (Bonaccorsi et al., 1973). Antihypertensives, aldosterone antagonist and potassium-sparing diuretics may cause erectile dysfunction, gynaecomascia and menorrhagia

The older agents are now available as generics, and are therefore cheaper. This makes patients to be on them for longer periods. However, it is documented that most of the older agents have the ability of leading to tolerance upon chronic use. This necessitates switching to newer agents which unfortunately could be beyond the reach of the common patient. The consequences of this will be non compliance with the medication due to cost.

2.3.3 Policies and their implementation

National policy guide lines have been recognized as an important strategy to effectively control both acute and chronic diseases including HPT (WHO, 2013). Such guide lines could relate to the manufacture and supply of good quality and effective drugs for the management of the disease and also acceptable quality of food and other consumable products that may indirectly promote the control of the health conditions.

The WHO (2005) has earlier suggests that the global chronic disease burden requires a ‘multi-faceted multi-institutional response for which experts recommend a three-prong approach that amalgamates epidemiological surveillance, primary prevention and secondary prevention of the diseases complications (Aikins et al., 2010b; Aikins, 2007a). Disease prevention is significant in avoiding further complications and improving the quality of life of people with chronic disease, and this may occur through medical, psychosocial and economic interventions (Aikins,



2012a). With respect to the structure to combat chronic diseases Aikins et al (2011), recommend interdisciplinary research that addresses the multi-faceted roots and consequences of disease. They also note the role of the provision of innovative interventions that make efficient use of existing economic and human resources.

As a result of pluralistic health system and practices there are a lot of medical and food products in the system that are promoted by media advertisement to the unsuspecting public. These vigorous marketing strategies undertaken by multinational food companies must be readdressed to ensure that food consumed have minimal risk to the development of chronic diseases including CVDs. There is the need for political, public and private support to ensure accessibility and affordability of efficacious drugs and healthy dietary choices by the general populations (Aikins et al, 2012a; Chow et al., 2009). Governments all over the world have laws that help to protect citizens from being short-changed with inappropriate health products. In Ghana for example, a public health law was enacted by parliament that band smoking in public places (Public Health Act-Act 851, 2012; section -58; Bosu, 2013). Such a measure goes a long way to reduce the contribution of passive smoking, which has been identified as a factor that works against the control of HPT (Basu, et al 2013; Halpin et al., 2010; CDC, 2009).

It is a health policy of governments that medicines should be prescribed by qualified health professionals. This ensures that the right medicines are taken by the patients who need them, thus leading to adequate management of the disease for which they are used. In a situation where there are lapses in the regulation of the prescribing and dispensing of medicines, unqualified individuals may hand out bad prescriptions that obviously will complicate the disease status.



2.4 Factors affecting the control of hypertension

A good guide to controlling hypertension entails correct measurement of blood pressure on an average of two to three times, which is repeated on more than three different occasions. Clinically, efforts are always made to keep raised blood pressure below a systolic value of 140 mmHg and a diastolic of 90 mmHg (Khatib and El-Guindy, 2005; Pimenta and Stowasser, 2009; Goverwa et al., 2012). These values are known to be the pressure values that guarantee protection against the development of HPT complications such as end organ damage and strokes. The control of raised blood pressure has however been a huge challenge for many patients, which merit attention of research into the factors that may be responsible for this difficulty. Societal transformation factors such as globalization, urbanization and dietary transition are some of the underlying factors that may affect the control of hypertension (Koopman, 2012 and Chapman, 2009). Additionally, knowledge about the disease, economic status and medication compliance are factors that may influence the control of hypertension.

2.4.1 Knowledge about the disease

Poor knowledge about chronic diseases, including HPT and how various factors affect their control, either pharmacologically or non-pharmacologically has been blamed for inadequate management that lead to complications (Aikins et al., 2010). For instance, knowledge that smoking is a risk factor for HPT and therefore negates any efforts at controlling the condition, may aid patients to achieve effective control with the known pharmacological and non-pharmacological means. It has been reported in a study that, more of the participants who did not smoke 125(79.1%), had their blood pressure controlled than those who smoked, 33 (20.9%) (Malik et al., 2008). The authors further reported that 54.6% of the participants who had



adequate knowledge of the disease had their hypertension controlled, compared with 35.5% of those with inadequate knowledge.

2.4.2 Economic

An individual, a community, and a nation as a unit have economic capabilities that can facilitate or challenge affordability of healthcare services. However, the unit can not alone influence the healthcare services provided unless all of its components are integrated. Living in poor communities jeopardizes efforts made at controlling infectious and chronic diseases including HPT, when compared with efforts made in urban and wealthy communities (Akins, 2010b). Studies have demonstrated that under-nutrition and malnutrition among poor communities stand in the way of strides to control chronic disease including CVDs such as HPT, rheumatic heart disease and dilated cardiomyopathy (Abanilla et al., 2011). Poor economic status that result in inappropriate eating habits such as consuming high amounts of refined sugars in childhood has been reported to promote type 2 diabetes, which is a known predisposing factor for hypertension and its control (Caprio et al., 2008). Conditions of poverty have further been implicated in economic and psychological stresses that have led to smoking and excessive alcohol intake, which in themselves have been shown to negatively affect the control of raised BP (Aikins, 2010b).

Poor economic status may lead to enforcing beliefs systems that put a lot of patient faith in unscientific healing systems that can militate against the control of a disease condition. For instance in a study in Zimbabwe by Goverwa et al (2012) it was found that the use of traditional herbs in poor communities was associated with uncontrolled blood pressure.



2.4.3 Medication compliance

Compliance with treatment regimen, which has transformed into adherence and to concordance, for the purpose of recognising the right of the patient in the treatment, is critical in the effective control of any disease. Cramer et al (2008), defined medication compliance as the degree or extent of conformity to the recommendations about day-to-day treatment by the provider with respect to the timing, dosage, and frequency. It may be defined as “the extent to which a patient acts in accordance with the prescribed interval and dose of a dosing regimen”. According to WHO (2003) compliance is ‘the extent to which a person's behaviour of taking medication, following a diet, and or executing lifestyle changes, corresponds with agreed recommendations from a health care provider’. Due to the already high burden from non-communicable diseases in low-income settings in particular, pharmacological control of hypertension is limited by cost (Goverwa et al., 2012; Bosu, 2010; Bosu, 2013). There is a mounting concern about medication non-adherence as they lead to poor disease outcomes and eventual higher costs of care. As cost becomes an issue confronting access to medications, this cost effect introduces another level of noncompliance (Bosu, 2013).

According to WHO, factors causing reduced adherence to hypertension can be broadly presented in three forms including patient-related, physician-related and team-building related or health system factors (Brown and Bussell, 2011). These can be classified into 5 factors as: patient-related, disease-related, therapy-related, socioeconomic and health care team and system factors (Brown and Bussell, 2011; Ho et al, 2009). Noncompliance to CVDs medication, particularly hypertension can be approximated by evaluating blood pressure and lipid level readings. The difficulty in reducing blood pressures to acceptable levels is probably due to poor compliance with medication which has been partly attributed to side effects of the



prescribed medication and lifestyle irregularities (Grégoire, 2006; Cramer, 2008; Calhoun et al., 2008).

The side effects, that, a patient may experience and which may affect the compliance with hypertensive therapy depend on the type of drug or combination of drugs used. The choice of a drug or combination of drugs over another could be determined by physician's diagnosis, decision and prescribed regimen which are influenced by, patient acceptance and persistence to take the medicine (Grégoire et al., 2006; Viera and Hinderliter, 2009). Other noncompliance factors to effective therapy are age, client awareness or understanding and importance of taking medicines, attitude of professionals towards clients and forgetfulness to take medicine. Psychological problems that may lead to white coat hypertension and also cost associated with prescribed medicines for those who may not be under social support like health insurance may also lead to non compliance (Hashmi et al., 2007; Bosu, 2010). Calhoun et al., (2008) have reported an appreciable rate of non-adherence in a retrospective study, where 40% of newly diagnosed hypertensives discontinued their medications. Also, when these patients were followed for 5 to 10 years, less than 40 patients continued their medication. Again, in the Goverwa et al (2012) study, it was shown that, non-compliance and irregular clinic visits were strongly associated with uncontrolled hypertension. Reasons cited by these authors for this noncompliance were inadequate knowledge, medication cost, missed taken of medicines and misinterpretation of how medication should be taken.

2.5 Consequences of uncontrolled hypertension

High blood pressure is a risk factor for repeated stroke every decade after age 55, but could occur before this age from inappropriate lifestyles, inadequate intake of food, consumption of



alcohol and less physical exercise (Lloyd-Sherlock et al, 2014; Zhang et al., 2013). With regard to Denker and Cohen (2013) and Zhang et al., (2013), comparing younger adults to older adults, the older adults are more likely to be aware of a diagnosis of hypertension and receive treatment for it but, older patients may develop resistant hypertension due to adherence patterns to treatment regimens and different physician's goals for elderly patients. Khatib and El-Guindy reported that the age threshold for developing an organ damage following HPT is < 55 years for men and < 65 years for women. Hence, there is the need to effectively reduce raised blood pressure to levels that have been established as normal. This is because it is the negative outcomes of untreated HPT that are the actual causes of death. The consequences of uncontrolled HPT have been clearly identified as discussed below:

Artery clogging is a result of untreated HPT, and it is known that smoking increases the artery clogging process called atherosclerosis (Cordero et al., 2011). The narrowing of the arteries limits blood flow, meaning that, less oxygen is supplied to the body tissues. If atherosclerosis narrows any of the heart's coronary blood vessels, this can lead to angina or heart attack. Stroke occurs when an artery supplying blood to a part of the brain suddenly becomes blocked. Studies have indicated that of 8.4% uncontrolled BP patients have complications like left ventricular hypertrophy, coronary artery disease and stroke (Kjeldsen et al., 2008).

In concluding, the foregoing review shows that hypertension is a major cause of morbidity and mortality (9.4%) of deaths worldwide. Over 80% of the world hypertension deaths occur in the sub-Saharan Africa in which Ghana is located. Apart from the established traditional risk factors like age, and genetics, high lipids, smoking, excess alcohol consumption, overweight and diabetes, urbanization and modernization are the major underlining driving forces. Life style changes due to sociocultural practices and its effects such as beliefs and types of health



practices, inadequate diet, and effects of knowledge about hypertension may still be underlining forces challenges the control of hypertension. The review has shown that, despite the efforts of various stakeholders such as governments, the health professionals and other health support efforts in the management of the condition, there is still a problem with the adequate control of HPT.



CHAPTER III

METHODOLOGY

3.1 Study design and method

The study was conducted using a cross-sectional survey design to gather data from the Tamale Teaching Hospital (TTH), Tamale West Hospital (TWH) and Tamale Central Hospital (TCH) between May 2014 and July 2014. A questionnaire was used to collect information on key sociodemographic characteristics, anthropometric parameters, sociocultural practices, knowledge on high blood pressure, management of hypertension and therapeutic compliance among adults 18 years and above. The primary outcome measure of the study was the number of participants with uncontrolled blood pressure on the day of the study.

3.2 Study site

The Tamale Teaching Hospital (TTH), Tamale West Hospital (TWH) and Tamale Central Hospital (TCH) were the sites for the study. Whilst the Tamale Teaching Hospital is found in the eastern part, the Tamale West Hospital is located immediately west to the central part and Tamale Central Hospital is situated in central part of the Tamale Metropolis. The Teaching Hospital serves as a referral centre for the three northern regions of the country including some parts of the Brong-Ahafo Region of Ghana. The hospitals have departments and units such as the OPD, Medical, Surgical, Paediatric and Pharmacy. There are also laboratory and X-ray facilities which augment the diagnostic efforts within the TTH. It has a bed occupancy of 71.5 (%) of total beds occupied at a period of time) and complement of 443 (number of beds available). Both the TWH and TCH are equivalent of district hospitals, with TWH serving western section and the surrounding villages. It has a bed complement of 126 and bed



occupancy rate of 75.5% (TWH Biostatistics Office, 2014). With a bed complement of 186 and a bed occupancy rate 98% (TCH Biostatistics Office, 2014), the TCH has no boundaries for its services and draws customers from any corner of the metropolis. All the two have number of units including OPD and antenatal for outpatient services. Others are medical, paediatric, gynaecological and pharmacy which take care of inpatients, with X-ray and laboratory in addition to support diagnostic services.

The specialists at the time of the study that man the TTH include one endoscopic surgeon, one urologist, one neuro-surgeon, two physician specialists and four physiotherapists. With regard to the other two hospitals, both had one general practitioner each but, only the TCH had gynaecologist as a specialist. The three health facilities are accredited health insurance providers under the National Health Insurance Scheme (NHIS) with majority of clients seeking services from the facilities being NHIS members.

3.3 Study population

The population under study was **known adult hypertensives** attending the TTH, TWH and TCH with no limitations to social, economic or occupational status and settlement, whether rural or urban within which the person may be residing. According to The National Population Council, the 2010 population census estimated the population of the Tamale Metropolis to be 371,351.

The study unit was all known hypertensive clients being 18 years or above and reporting to TTH, TWH and TCH for their scheduled visit or self-report to the facility for medical attention.

Individuals who had just been diagnosed with high blood pressure, those who were unable to stand for anthropometric parameters measurement (like the aged, incapacitation), and those who did not consent to taking part of the research were excluded from the study.



3.4 Sample size determination

The number of participants in the study was determined based on the prevalence of hypertension in Ghana, reported as being between 25 and 48% (Tagoe et al., 2012). A total of 356 respondents were determined using the Cochran's method for the sample size calculation, assuming a confidence interval (CI) of 95%, and 0.05 precision (margin of error), as follows;

$$n = [t^2 \times (p \times 1-p)] / m^2$$

Where, n is the number recruited, t is the corresponding value for normal distribution (1.96) for 95% CI, p is the prevalence rate (using the median of 36.5% for the reported range) and m is margin of error of estimation.

$$\begin{aligned} \text{Therefore, } n &= (1.96)^2 \times 0.365(1 - 0.365) / (0.05)^2 \\ &= 3.8416 \times 0.365 \times 0.635 / 0.0025 \\ &= 356 \end{aligned}$$

In allowing for contingencies, the sample size was increased by 10% of the formula output to give total of 392.

3.5 Participant selection

Participants were randomly selected from the hypertensives visiting the identified health facilities using a simple random method with the help of a random numbering pattern generated by a computer. On the day of the visit, potential participants, that is, those who were known hypertensives irrespective of the status of their blood pressure on that day, were numbered and all individuals who had even numbers were approached to be part of the study. The study was briefly explained to selected participants and those who consented to participate were included



in the study. Blood pressure and anthropometric parameters of selected participants were measured by 5 research assistants who were trained for the data collection. On the average, each participant was involved in the research for 20 minutes.

3.6 Data collection Tools and Methods

The main tool used to collect data was a semi-structured questionnaire comprising open and closed ended questions (See Appendix 1). The questionnaire was used to gather information on the sociodemographic characteristics, such as age, gender, educational level, occupation, marital status and income level. **There were questions in the questionnaire to collect data on sociocultural practice such as types of health practices, food habits such as types of foods eaten and how often these foods were eaten per week. Questions were also formulated to gather information on the type of exercise engaged by participants and also information on the consumption of alcohol or tobacco usage.** A draft questionnaire was prepared and pretested on 10 known hypertensive clients who reported at the Tamale Teaching Hospital OPD and also on 5 nurses from the medical department of the TTH. All concerns which bordered mainly on clarity of questions which were in the draft questionnaire were addressed and incorporated into the final questionnaire.

The five research assistants collected data from all participants at the three hospitals using a comprehensive data collection plan to ensure efficiency. There was a daily review of each day's data to identify obstacles encountered so as to ensure appropriate redress, and also to discuss the next day's schedule. On the day of data collection, explanation and interpretation were given to participants who could not provide answers themselves. Additionally participants were observed to ensure appropriate responses were given to the various questions. Those who could



provide answers themselves were given the questionnaire with explanations and guide where needed.

The main outcome measure, which was the participant's blood pressure on reporting, was taken using a sphygmomanometer after they had waited for at least 5 minutes. Waist circumference was determined in centimetres using measuring tape to pass on the bare body flat from behind to from midway between the iliac crest and lower rib to just beneath the navel after exhalation. Thigh circumference was also taken with the same measuring tape around the thigh at the end of the gluteal muscle with client at eased standing in the upright position. Weight was determined in kilogrammes (kg) with a weighing scale without shoe. Height was also taken in metres (m) with a stadiometre without a shoe. BMI was then calculated by dividing weight (kg) and height (m²), (kg/m²).

3.7 Definition of study variable

In order to accurately determine the study outcome, the study variables were defined as follows:

- a. Uncontrolled blood pressure. This was defined as blood pressure of a known hypertensive that was > 140mmHg, for systolic or > 90mmHg, for diastolic.
- b. Thigh circumference (TC) was categorized on the bases of gender. A TC was considered small for men if TC was < 60cm and classified small for women if it was < or around 68cm.
- c. Knowledge about hypertension was measured by standard questions on the disease, such as what level is BP considered high, what high blood pressure (HBP) >140/90 meant, and



whether HBP could be cured. Lifestyle practices that could influence or help reduce HBP such as habits of exercise and substance intake were also asked. Other questions involve psychosocial influences (beliefs, bereavement, environment and personal emotions and media advertisement) of hypertension. Participants were also asked of risk factors associated to HBP including conditions like diabetes, overweight, depression and media advertisement. Responses were expected of participants in the form Yes or NO, and multiple choices of at most five for them to choose one or more. Right answers to these questions were scored out of 100%. Knowledge was then categorized into adequate when a respondent scored above or equal to 50% and inadequate when a respondent had less than 50% of the score.

3.8 Data handling, analyses and presentation

All data collected were first entered into Microsoft Office Excel 2007 and cleaned of any duplication. The cleaned data was then transferred to the computer software SPSS IBM version 20 (Illinois, USA) for statistical analysis. The Chi-square tests was used for establishing any association between the state of BP (Controlled Vs Uncontrolled) and sociodemographic characteristic, sociocultural practices, knowledge on the control of hypertension, management and therapeutic compliance with the control of hypertension. Pearson's correlation test was used to test for any association between blood pressure and clients anthropometric parameters. The logistic regression analysis was used to predict any risk of uncontrolled BP from sociocultural practices, and knowledge. A p-value of less than 0.05 was taken to be significant at confidence interval of 95%.



3.9 Ethical consideration

Ethical clearance and authorization were sought for from the Tamale Teaching Hospital. In applying for the authorization, the study protocol (Appendix III) with an attached clearance letter from the school was presented to the Regional Health Directorate and Tamale Teaching Hospital. Participant's consents were sought, and only those who voluntarily agreed to partake were included in the study.



CHAPTER IV

RESULTS

This chapter of the thesis presents the results from the analysis of the data collected. It is organized in three main sections. Section one describes the characteristics of data collected from the participants. Section two makes inferences of the data collected from the sample to the wide population based on the objective set out for the study. Section three presents the analysis of the prediction of identified factors in the control of high blood pressure.

4.1 Characteristics of participants

As have been discussed earlier, this work was a cross-sectional survey to assess the factors that affect the control of high blood pressure. The current chapter presents the results of the analysis of the data gathered from participants, and included respondent's socio-demographic characteristics, socio-cultural practices, knowledge on hypertension and compliance with treatment. The chapter is organised into two main sections; the first section presents the summary characteristics of the data collected, whilst the second section draws inferences from the sample to the wider population.

4.1.1 Socio-demographic characteristics

There were 356 participants recruited, with a mean age (standard deviation) of 54(13.3) years with females making up 224 (62.9%) of the total. Most of the respondents 158(44.4%) had no formal education, and with the 188(51.5%) who had some form of education, 75(21.1%) was tertiary. With regard to occupation, most of the respondents were traders 117(32.9%), and health care professionals formed only 9.6% of the entire sample.



Table 4.1: Distribution of sociodemographic characteristics of respondents (n = 356)

| Variable | N | % |
|-------------------------------|-----|------|
| Gender | | |
| Male | 132 | 37.1 |
| Female | 224 | 62.9 |
| Family member with HBP | 135 | 37.9 |
| Educational level | | |
| No formal | 158 | 44.8 |
| Non formal | 12 | 3.4 |
| Basic | 64 | 18.1 |
| Secondary | 44 | 12.5 |
| Tertiary | 75 | 21.2 |
| Occupation | | |
| Trader | 117 | 33.5 |
| Farmer | 47 | 13.5 |
| Civil servant | 70 | 20.1 |
| Health professional | 34 | 9.7 |
| Others | 81 | 23.2 |
| Religion | | |
| Muslim | 247 | 69.4 |
| Christian | 103 | 28.9 |
| Traditional | 5 | 1.4 |
| Others | 1 | 0.3 |
| Marital status | | |
| Married | 276 | 78.9 |
| Single | 23 | 6.6 |
| Separated | 5 | 1.4 |
| Divorced | 9 | 2.6 |
| Widowed | 42 | 12.0 |

Out of the total of 356, N is the number of participants who responded to the particular question asked on the variable, % is percentages of N with groups of categories of sociodemographic characteristics as age, family members with HBP, educational level, occupation, religion and marital status.

In terms of religion, Islam dominated with 247(69.4%) followed by Christianity, 103(28.9%). Majority of the respondents were married 276 (77.5%), while just a few respondents 5 (1.4%) were separated. Regarding income of participants, majority of them were reluctant to state their monthly income and others did not know the amount they earned. Few participants (45, 13.5%) particularly those employed, stated their monthly income where the lowest income per month was 40 Ghana cedis and the highest income per month being 1500 Ghana cedis. The median



income was 650 Ghana cedis. A summary of the sociodemographic characteristics is shown in Table 4.1.

4.1.2 Respondents blood pressure status and body size indicators

The summary of the primary outcome measure which is the level of blood pressure of participants at the time of recruitment, and also that of the participants' anthropometric measurements, are presented in Table 4.2. The figures represent the means and standard deviations from the means for each variable.

Table 4.2: Means and standard deviations of blood pressures, and anthropometric parameters of respondents (N = 356)

| Variable | Mean | SD |
|----------------------------|-------------|-----------|
| Systolic BP (mmHg) | 133 | 24.8 |
| Diastolic BP (mmHg) | 83 | 14.6 |
| BMI | 27.5 | 5.6 |
| WC(cm) | 85.3 | 10.1 |
| TC(cm) | 57.3 | 4.4 |

Where *SD* is standard deviation, *BMI* is body mass index, *WC* is waist circumference and *TC* is thigh circumference.

Considering the WHO Joint National Committee on Prevention, Evaluation, and Treatment (JNC7) report definition of hypertension as readings of blood pressure above or equal to 140/90mmHg, there were 229(64.4%) and 228(64.1%) respondents who had normal BPs regarding systolic and diastolic when these values were considered separately.



Table 4.3: Distribution of respondents' according to risk of CVD with respect to blood pressure

| Variables | | N° with controlled BP (%) | | No with uncontrolled BP (%) | |
|---------------------------|--------|----------------------------------|--------|------------------------------------|--------|
| Systolic BP(mmHg) | Male | 77 | (21.6) | 55 | (14.9) |
| | Female | 150 | (42.2) | 74 | (20.8) |
| | Total | 227 | (63.8) | 129 | (36.3) |
| Diastolic BP(mmHg) | Male | 79 | (59.8) | 53 | (40.2) |
| | Female | 148 | (66.1) | 76 | (33.9) |
| | Total | 227 | (63.8) | 129 | (36.2) |

Where N° is number of respondents, % is percentage of No

4.1.3 Sociocultural practices

Data on the type of health practices, and participant's faith in it, showed that participants accessed more than one health practice to take care of their health need. Majority of participants, 354(99.4%) practiced orthodox medicine; 335(94.1%) practiced Faith health healing with only 72 (20%) practicing Traditional faith healing as shown in Figures 4.2 and 4.3.



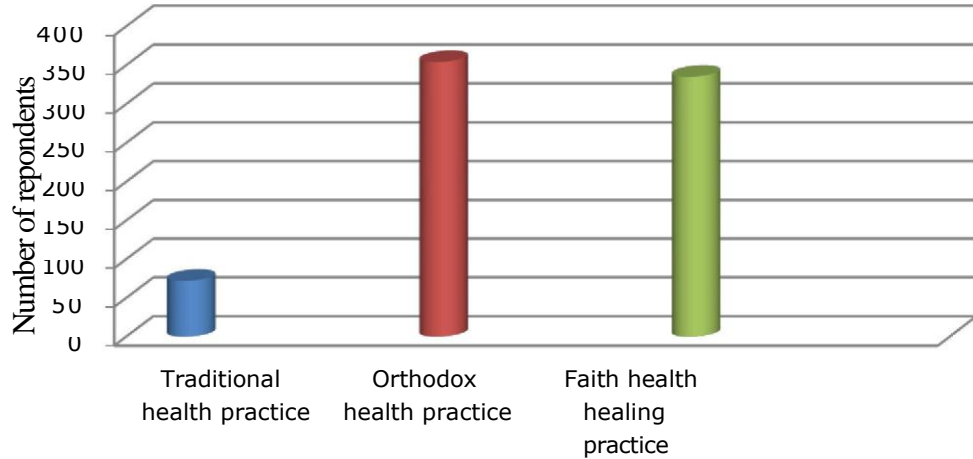


Figure 4.2: Distribution of health practices among respondents (N= 356). Horizontal axis are bars of respondents types of health practices with vertical axis, number of respondents to practices.

Some of the respondents practiced more than one faith healing (Figure 4.3) as they did for



health practices.

Figure 4.3: Illustration of types of Faith health healing practices of participants with their



numbers



With regards to food, carbohydrate was the most commonly eaten food group, and it was frequently taken in the form of maize, which represented 339 (95.2%), followed by proteins from fish 336(94.4%) and fat in the form of groundnut oil (Table 4.4).

Table 4.4: Distribution of types of foods often eaten, and the consumption of the foods in days per week (N=356)

| Variable | Types of foods eaten | N ^o of participants | (%) |
|--------------------------|---------------------------------|--------------------------------|--------|
| Types of foods | | | |
| Carbohydrates | | | |
| | Maize | 339 | (95.2) |
| | Rice | 306 | (86.0) |
| | Yam | 296 | (83.1) |
| | Cassava | 136 | (38.2) |
| Oil | | | |
| | Groundnut | 206 | (57.9) |
| | Refined palm | 135 | (37.9) |
| | Palm | 159 | (44.7) |
| Protein | | | |
| | Beef | 235 | (66.0) |
| | Fish | 336 | (94.4) |
| | Beans | 286 | (80.3) |
| Foods often eaten | | | |
| (Days per week) | 7/1 Cereals | 173 | (48.6) |
| | 7/1 Sugar | 107 | (30.1) |
| | 4/1 Vegetables | 106 | (22.8) |
| | 2/1 Tubers | 135 | (37.9) |
| | 2/1 Groundnuts and its products | 110 | (30.9) |
| | 2/1 Fruits | 96 | (27.0) |
| | 1/1 Oil | 103 | (28.9) |
| | 1/1 Chicken | 75 | (21.1) |
| | 1/1 Beef | 72 | (20.2) |
| | 1/1 Mutton | 59 | (19.4) |
| | 1/1 Eggs | 67 | (18.8) |

Where N^o is the number of participants and % is the percentage of N_o



In addition, it was found that with foods often taken per week, cereals were eaten every day in the week, and was eaten by a total of 173(48.6%) respondents and almost all types of protein foods were taken once a week.

Vegetables were consumed by 106(22.8%) respondents, and were eaten 4 days per week which was frequent than fruits, which recorded 96(27.0%) consumers, and taken 2 days per week.

Most of the participants (229, 64.3%) did brisk walking as a daily exercise while few engaged in strenuous exercise 13(3.7%) like weight lifting and football, categorized as “Others”. There were 38(10.7%) respondents who took alcohol, while 12(3.4%) either smoked or snuffed tobacco (Table 4.5).

Table 4.5: Numbers (percentages) of respondents indulged in common lifestyle habits (N=356)

| Variable | No of participants (%) | |
|---|-------------------------------|--------|
| Lifestyle practices (daily exercise) | | |
| Bicycle ridding | 49 | (13.8) |
| Jogging | 38 | (10.7) |
| Brisk walking | 229 | (64.3) |
| None | 55 | (15.4) |
| Others | 13 | (3.7) |
| Alcoholic drink and smoke intake | | |
| Alcohol intake | 38 | (10.7) |
| Tobacco intake | 12 | (3.4) |

N_o is the number of participants and % is percentage of N_o

With regard to source of medication, 350(98.3%) participants said they obtained their medicines from hospital or community pharmacy to manage their high blood pressure, whilst



58 (16.3%) and 4(1.2%) patronised herbalists and drug peddlers respectively. A total of 107(30.1%) had messages from media advertisements which helped them to decide on the type of medication, and for 82(23.0%) the advertisements helped them to decide on the source of medication (Table 4.6).

Table 4.6: Distribution respondents source of medicines and reported benefits from media advertisements regarding medicines use

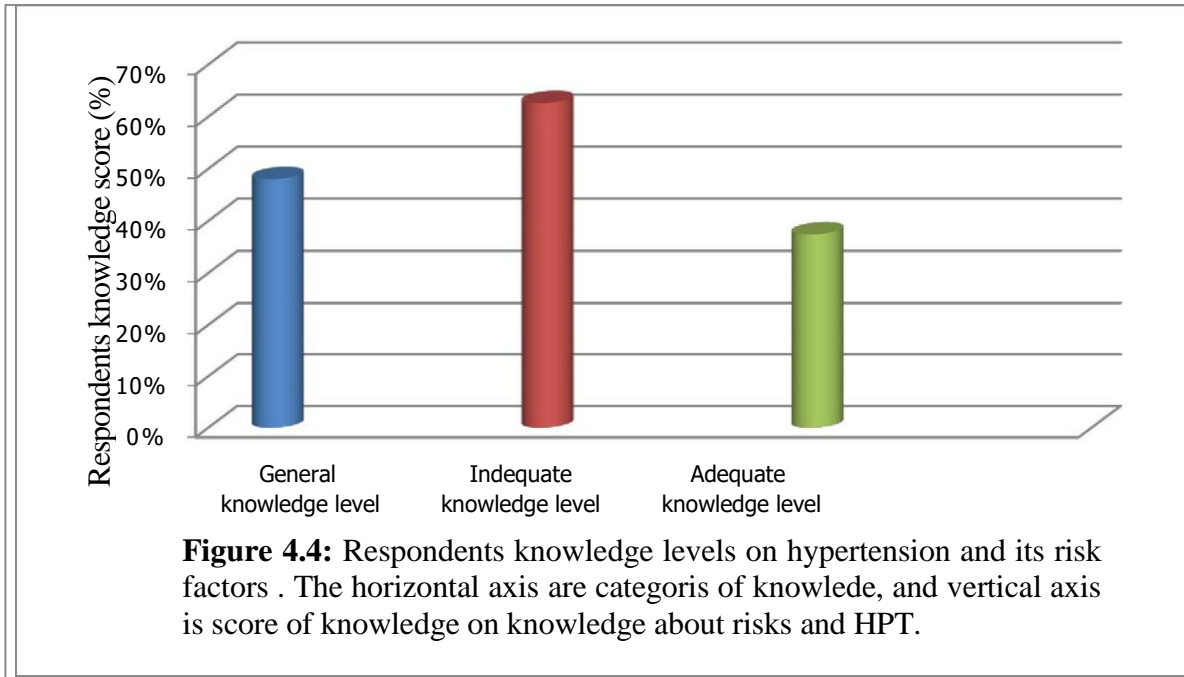
| Variable | No of participants (%) | |
|--|-------------------------------|--------|
| Source of medicine | | |
| Hospital/Community Pharmacy | 350 | (98.3) |
| Licensed chemical shop | 121 | (34.0) |
| Herbalist | 58 | (16.3) |
| Self-medication | 15 | (4.2) |
| Drug peddlers | 4 | (1.1) |
| Media Adverts | 223 | (62.2) |
| Benefits from media | | |
| Help me decide on the medication | 62 | (17.4) |
| Help me decide on the source of medicine | 82 | (23.0) |
| Help me decide on the type of medication | 107 | (30.1) |

No is the number of participants and % is percentage of participants

4.1.4 Participants knowledge about hypertension

Participants overall knowledge on the sociocultural practices that promote effective control of high blood pressure were assessed out of 100%, using questions as provided in section C of the questionnaire (Appendix I). The mean \pm SD knowledge score was $48 \pm 18.1\%$. In all, (37.4%) of respondents had adequate knowledge, determined as knowledge score equal to or above 50%.





With reference to JNC 7 acceptable values of systolic and diastolic pressures as high blood pressures, 93(26.1%) respondents knew that BP above or equal to 140/90mmHg was the right value for HPB (Table 4.7). Almost half of the participants (173, 48.6%) did not know that, at that value BP was considered high. Moreover, an appreciable number, 101 (28.4%) wrongly thought that HBP can be cured. Whilst 174(48.9%) respondents knew that smoking can make the control of HBP difficult, only 30(8.4%) said it was beneficial to take alcohol to control blood pressure. With regards to how HBP could be reduced, most respondents (312, 86.7%) thought taking prescribed medication can help reduce the HBP, whilst 31(8.7%) agreed that one could include herbal medicines to help in the reduction of HBP.



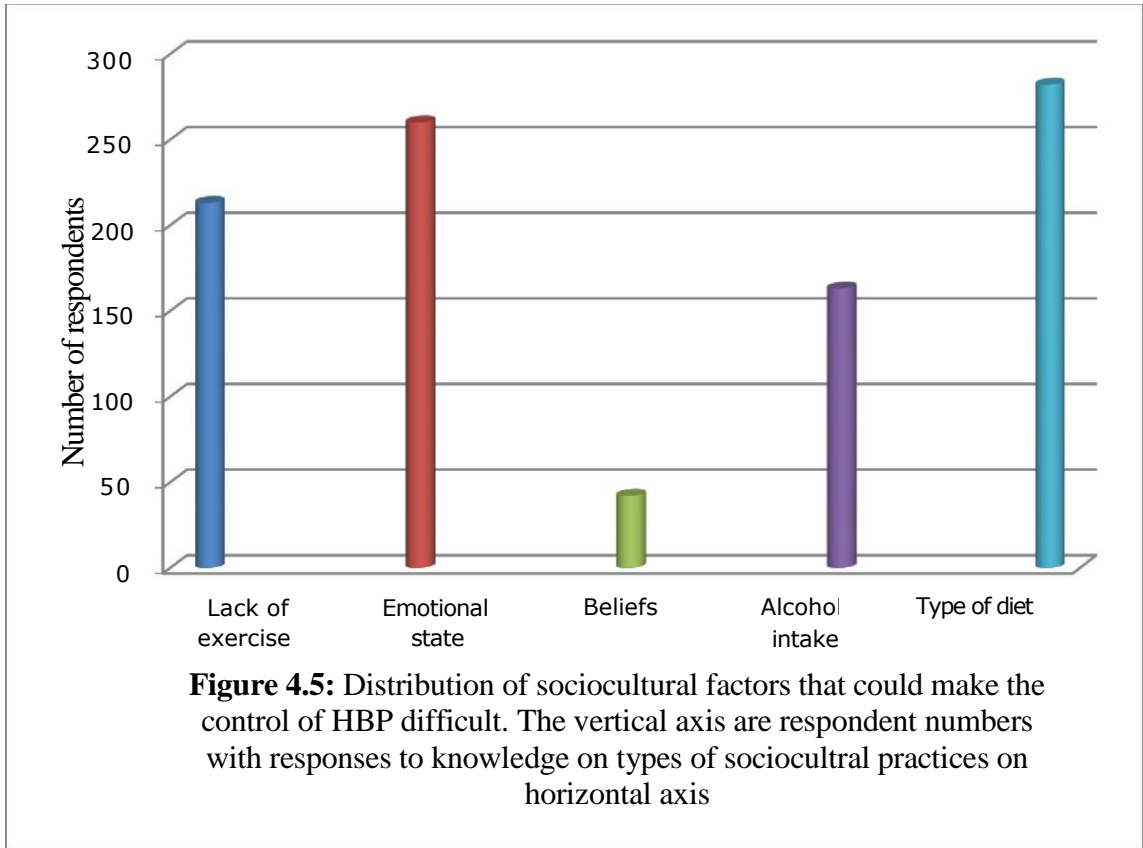
Table 4.7: Distribution of knowledge of respondents on values for high blood pressure, and how to reduce HPB

| Variables | N° of participants (%) | |
|--|------------------------|--------|
| Knowledge on the right average value of HBP | | |
| HBP > 120/80 mmHg | 8 | (2.2) |
| HBP > 130/90 mmHg | 20 | (5.6) |
| HBP > 130/90 mmHg | 56 | (15.7) |
| HBP > 140/90 mmHg | 93 | (26.1) |
| Do not know | 173 | (48.6) |
| HBP cannot be cured | 101 | (28.4) |
| It is beneficial to take alcohol | 30 | (8.4) |
| Smoking affects the control of HBP | 174 | (48.9) |
| How can HBB be reduced? | | |
| Taking prescribed medications | 312 | (86.7) |
| Taking medication regularly | 274 | (77.0) |
| Exercising accordingly | 178 | (50.0) |
| Medication and exercising accordingly | 16 | (4.5) |
| Herbal preparation | 31 | (8.7) |

N_o represents numbers of participants with corresponding percentages (%) of responses to questionnaire on knowledge about sociocultural practices that affect the control of hypertension

Respondents' knowledge on socio-cultural factors that could hinder the control of BP is presented in Figure 4.5. Majority of respondents (282, 79.2%) stated 'type of diet' followed by emotional state (260, 73.0%) as factors that could make the control of HBP difficult. Belief was the least factor thought to hinder blood pressure control, and was agreed by just 42 respondents, representing 11.8% of the participants.





Most participants thought intake of high amount of salt (317, 89.0%) and fast food (264, 74.2%) respectively are food habits that could affect or make the control of HPT difficult. Just few respondents (11, 3.1%) thought that vegetables could prevent the control of HPT. On the part of social habits, 99(27.8%) did not know that any of the listed life-styles hindered BP reduction, whilst 196(55.1%) and (161, 45.2%) respondents knew that lack of leisure time and inadequate exercise, respectively could make control of BP difficult (Table 4.8).



Table 4.8: Distribution of responses on food, social and lifestyles habits that could make the control of HBP difficult

| Variable | N° of participants (%) | |
|-------------------------------|------------------------|--------|
| Food habits | | |
| Fast foods | 146 | (41.0) |
| Oily foods | 264 | (74.2) |
| Fruits and vegetables | 11 | (3.1) |
| Inappropriate salt | 317 | (89.0) |
| Refined foods | 66 | (18.5) |
| Lifestyle habits | | |
| Lack of socialization | 74 | (20.8) |
| Lack of leisure time | 196 | (55.1) |
| Do not know | 99 | (27.8) |
| Car use as means of transport | 119 | (33.4) |
| Inadequate exercise | 161 | (45.2) |

Where N° is number of participants, % is percentage of participants, and types of practices as food and lifestyle habits by participants

4.1.5 Economic commitment and social implications of uncontrolled hypertension

The commitment made both economically and socially to control raised blood pressure are presented in Table 4.9. Most respondents 298(83.7%) visited the hospital once in a month for their routine clinical check-up towards the management of their HPT. 241(67.7%) respondents were able to cost their expenditure per trip to the health facility. Most of the respondents (214, 60.1%) spent as low as 1-50 Ghana cedis per visit to the clinic, while a few respondents 2 (2.2%) spent more than 200 Ghana cedis for each round of visit.



Table 4.9: Distribution of economic commitment and social implications of HBP

| Variable | N° of participants (%) | |
|--|------------------------|--------|
| Times respondents sought attention in a month | | |
| Once | 298 | (83.7) |
| Twice | 37 | (10.4) |
| Thrice | 5 | (1.5) |
| Four times | 1 | (0.3) |
| Cost of round of attendance (GH cedis) | | |
| 1 – 50 | 214 | (60.1) |
| 51 – 100 | 10 | (2.8) |
| 101-200 | 11 | (3.1) |
| >200 | 8 | (2.2) |
| Monthly absence from work (N of days) | | |
| 1 | 42 | (11.8) |
| 2 – 3 | 80 | (22.8) |
| 4 – 7 | 30 | (8.4) |
| Social effect | | |
| Social isolation | 16 | (4.5) |
| Self isolation | 35 | (9.8) |
| Threat at work | 72 | (20.2) |
| Avoidance of social functions | 104 | (29.1) |
| Missed work | 200 | (56.0) |

No is numbers of participants who were affected economically and socially due to the high blood pressure effects

The cost of attendance ranged from a minimum of 1 Ghana cedis to a maximum of 362 Ghana cedis with a median cost of 14 Ghana cedis. However, almost everybody (345, 96.9%) was covered by the National Health Insurance Scheme (NHIS) from which drugs that were under the insurance were accessed free of charged. Regarding the effects of HBP on respondents work, a total of 42(11.8%) said they were not able to go to work for 1 day in a month due to the disturbance or visit to clinic. Avoidance of social functions was one of the social effects respondents associated with HPT, with 104(29.1%) participants saying they were affected.

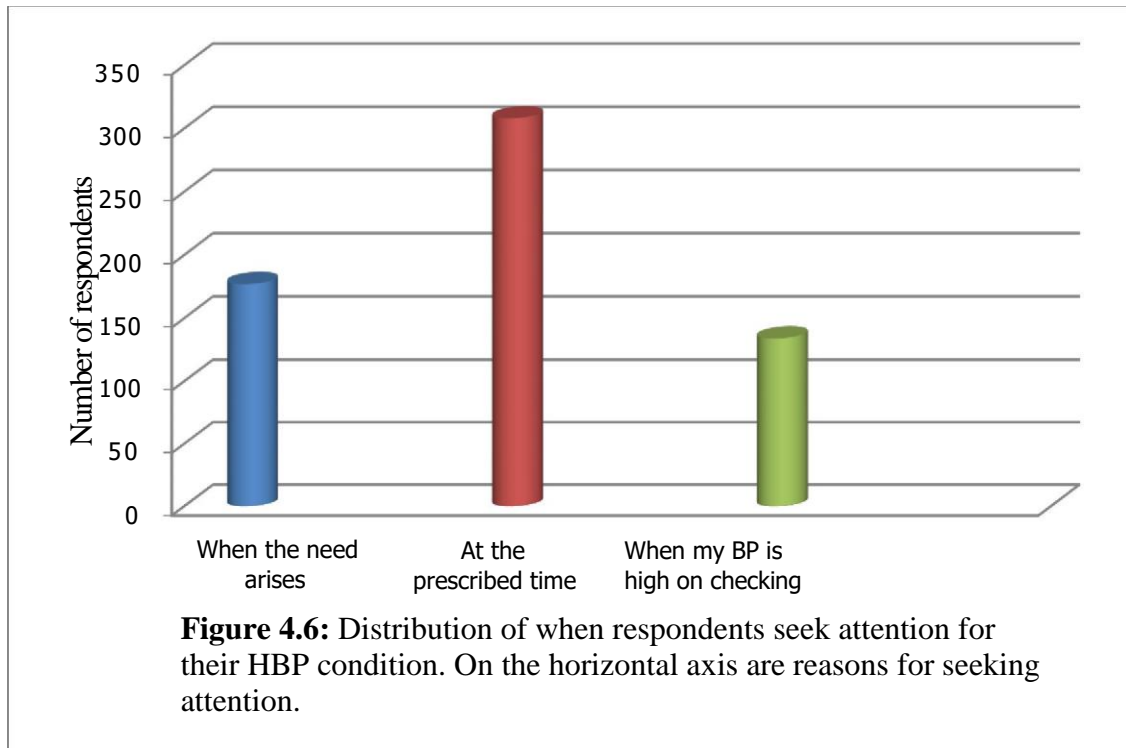
There were 200(56.0%) respondents who indicated they missed work due to their condition



with a small number 16(4.5%) of respondents indicating that they have been socially isolated because of their health condition.

4.1.6 Attitude towards therapy for the control of hypertension

As to when participants sought attention due to high blood pressure, majority (308, 86.50%) said they went to the health facility at the prescribed time, while almost half of the respondents also visited when the need arose (177, 49.7%), (Figure 4.6).



The data gathered showed that majority of respondents (257, 72%) patronize the pharmacy than any other medicines outlet for their medicine. Many (171, 47.1%) of respondents had ever missed medication, 103(28.9%) stated when they recollect the missed medication, they immediately took it, and only 20(5.6%) took their missed medicines the next day. A very high number of respondents (322, 90.4%) took prescribed meals in addition to drugs to manage their condition, while a few 88(24.7%) stopped taking alcohol to help manage their hypertensive condition.

Table 4.10: A distribution of attitude towards treatment of hypertension

| Variable | N ^o | (%) |
|---|----------------|--------|
| Frequency of attention (per month) | | |
| Twice | 57 | (16.0) |
| Thrice | 14 | (3.9) |
| Once | 256 | (71.9) |
| Sources of accessing medicine | | |
| Chemical licensed shops | 104 | (29.1) |
| Drug peddlers | 12 | (3.4) |
| Pharmacy | 257 | (72.0) |
| Health professionals | 209 | (58.5) |
| Herbal medicine | 45 | (12.6) |
| Missed medication | 171 | (47.1) |
| When missed dose is taken | | |
| Immediately I remember | 103 | (28.9) |
| At the prescribed time | 45 | (1.25) |
| The next day | 20 | (5.6) |
| Non drug management | | |
| Eating prescribed meals | 322 | (90.4) |
| Eating fruits and vegetables | 215 | (60.4) |
| Stop taking alcohol | 88 | (24.7) |
| Follow prescribed medication | 209 | (58.7) |
| Seek any additional advice | 123 | (34.6) |

No is the numbers and groups of respondents with their percentages (%) and various attitude variable factors.



4.2 Effects of patient factors and practices on the control of high blood pressure

The main outcome measure, participants blood pressures at the time of recruitment, was uncontrolled BP, when readings were ≥ 140 mmHg for systolic and > 90 mmHg for diastolic. Out of the 356 respondents, there were equal numbers 129 (36.2 %) who had both their systolic and diastolic blood pressures uncontrolled. The results of the Chi-square analysis for associations between the BP category and patient factors and practices are represented as follows.

4.2.1 Socio-demographic characteristics and BP status

The results of the Chi-square test for associations between respondents socio-demographic characteristics and the status of BP (controlled or uncontrolled) are presented in Table 4.11. There was no association between gender and the status of BP with respect to systolic and diastolic PBs (p-value of 0.135 and 0.351), although percentage-wise, there were more men with uncontrolled BP compared with women BPs 41.2% vs. 32.9% for systolic, and 40.5% vs. 33.9% for diastolic.

Age was categorized into risky age group when respondent's age was less than 55 years for males and 65 years for females, respectively. Age was categorized as 'non-risk' when respondent's age was ≥ 55 for males and ≥ 65 years for females.

A higher number of participants who were in the risky age category (82, 33.3% for systolic and 88, 35.8% for diastolic respectively) had uncontrolled BPs than those in the non-risky age group. However, this difference was not statistically significant to imply any association between age and BP status (either controlled or not controlled) as in Table 4.11 above.



Table 4.11: Association between socio-demographic characteristics of respondents and controlled status of HBP

| Variable | | N° with uncon systolic BP (%) | | P | N° with uncon diastolic BP (%) | | P |
|-------------------------------|----------------------|-------------------------------------|---------|-------|--------------------------------------|---------|-------|
| Gender | Male | 54 | (41.2) | 0.102 | 53 | (40.2) | 0.238 |
| | Female | 74 | (32.9) | | 76 | (33.9) | |
| Risky age | | 82 | (33.3) | 0.123 | 88 | (35.8) | 0.786 |
| Non-risk age | | 46 | (41.8) | | 41 | (37.3) | |
| Family member with HBP | | | | | | | |
| | Yes | 46 | (34.1) | 0.508 | 42 | (31.1) | 0.461 |
| | No | 18 | (32.7) | | 21 | (38.2) | |
| | Not known | 29 | (43.9) | | 27 | (40.2) | |
| Educational level | | | | | | | |
| | No-formal education | 54 | (34.2) | 0.150 | 50 | (31.6) | 0.117 |
| | Non-formal education | 4 | (33.3) | | 5 | (41.7) | |
| | Basic education | 28 | (43.8) | | 25 | (39.1) | |
| | Secondary education | 13 | (29.5) | | 14 | (31.8) | |
| | Tertiary education | 26 | (34.7) | | 32 | (42.7) | |
| Occupation | | | | | | | |
| | Trader | 40 | (34.2) | 0.350 | 48 | (41.0) | 0.073 |
| | Farmer | 22 | (46.8) | | 17 | (36.2) | |
| | Civil servant | 28 | (40.0) | | 32 | (45.7) | |
| | Health professional | 8 | (23.5) | | 9 | (26.5) | |
| | Others | 28 | (34.6) | | 20 | (24.7) | |
| Marital status | | | | | | | |
| | Married | 102 | (37.0) | 0.881 | 102 | (937.0) | 0.897 |
| | Single | 7 | (30.4) | | 8 | (34.8) | |
| | Separated | 2 | (40.0) | | 1 | (20.0) | |
| | Divorced | 4 | (44.4) | | 4 | (44.4) | |
| | Widowed | 13 | (31.0) | | 14 | (33.3) | |
| Religion | | | | | | | |
| | Traditional | 1 | (20.0) | 0.344 | 1 | (20.0) | 0.667 |
| | Muslim | 93 | (37.7) | | 93 | (37.7) | |
| | Christian | 34 | (32.0) | | 36 | (43.00) | |
| | Others | 1 | (100.0) | | 0 | (0.0) | |
| Income(C) /month | | | | | | | |
| | ≤ 180 | 2 | (50.0) | 0.154 | 3 | (75.0) | 0.011 |
| | >180 | 20 | (48.8) | | 22 | (53.7) | |

N_o is numbers and groups of sociodemographic characteristics of participants, with uncontrolled BPs with their percentages (%) with their corresponding P as p-values to their rights.



Participants who did not know that any of their family members had HBP were the most with uncontrolled systolic (43.9%) and diastolic (40.2%) B.P. but, those who knew had the least of uncontrolled BP, 31.1%.

The analysis of the sociodemographic characteristics indicated that participants with basic education formed a higher percentage of those with uncontrolled systolic BP (28, 43.8%) and those with tertiary education had the most uncontrolled diastolic (32, 42.7%). Despite this difference the p-value returned by the chi-square test did not indicate any association between level of education and the category of BP status.

With regards to occupation, farmers were the most with uncontrolled systolic BP (46.8%), followed by civil servants (40%). Health professionals were the least represented in the category of uncontrolled systolic BP (23.5%). With respect to uncontrolled diastolic BP, Civil Servants were the most represented, whilst others, made up of other skilled and non-skilled respondents, were in the lowest percentage (24.7%). However, there was no significant association between occupation and BP status.

Divorcees were the highest among participants with uncontrolled systolic BP (44.4%), followed by separated couples (40.0%), whereas the least were those in the single marriage (30.4%). Similarly, divorcee formed the largest proportion of respondents with uncontrolled diastolic BP (44.4%), whilst married couples were the least. There was no statistically significant association between marital status and status of B.P ($p = 0.881$ for systolic pressure and 0.897 for diastolic pressure).

The religious group with most uncontrolled diastolic BP was Christianity with 43%, followed by Moslems with 37.7%. There was no association between religion and the control of BP, as



the significance values from the test of associations were 0.344 and 0.667, for systolic and diastolic respectively.

Income per month was categorized based on the national minimum daily income of 6 Ghana cedis worked out for 30 days into those earning below or just the minimum wage, (where income was \leq 180 Ghana cedis) and above the minimum wage (where income was $>$ 180 Ghana cedis). Out of the 45 respondents who presented their income levels, 20(48.8%) who earned more than 180 Ghana cedis had their systolic blood pressure uncontrolled compared to 50% of those who earn less than ₵180. More individuals who earned less or just the daily minimum wage had their BPs uncontrolled compared to those who earned above the minimum wage. The association between income level and BP control was however only significant for diastolic pressure (75 vs, 53, $p = 0.011$).

4.2.2 Effects of sociocultural practices on BP status

When the Chi-square test was used to test for association between sociocultural practices and BP status it was only fish intake that was significantly associated with the status of diastolic BP. For respondents who often took fish only 34.5% had their diastolic BP uncontrolled compared with 65.0% of those who did not often take fish as a type of food. This difference was statistically significant ($p = 0.006$).



Table 4.12: Effects of food eating habits on the control of HPT

| Variables | | | N° with uncon | | P | N° with uncon | | P |
|------------------------------------|----------------|-----|-----------------|--------|-------|------------------|--------|-------|
| | | | systolic BP (%) | | | diastolic BP (%) | | |
| Frequently eaten food types | | | | | | | | |
| Carbohydrate | Cereals(maize) | Yes | 125 | (36.9) | 0.107 | 123 | (36.3) | 0.934 |
| | | No | 3 | (17.6) | | 6 | (35.3) | |
| | Tubers(yam) | Yes | 106 | (35.8) | 0.737 | 104 | (35.1) | 0.431 |
| | | No | 22 | (37.3) | | 25 | (42.4) | |
| Oil | Groundnut | Yes | 74 | (35.9) | 0.988 | 73 | (35.4) | 0.713 |
| | | No | 54 | (36.0) | | 56 | (37.3) | |
| Protein | Beef | Yes | 85 | (36.2) | 0.400 | 85 | (36.2) | 0.413 |
| | | No | 42 | (35.0) | | 43 | (35.8) | |
| | Beans | Yes | 102 | (35.7) | 0.817 | 101 | (35.3) | 0.465 |
| | | No | 26 | (37.1) | | 28 | (40.0) | |
| Fish | Yes | 117 | (34.8) | 0.068 | 116 | (34.5) | 0.006 | |
| | No | 11 | (55.0) | | 13 | (65.0) | | |
| Take alcoholic drink | | Yes | 18 | (47.4) | 0.118 | 21 | (55.3) | 0.014 |
| | | No | 109 | (34.4) | | 107 | (33.8) | |

N is numbers and groups of participants with percentages (%) of uncontrolled systolic and diastolic BPs. *P* is the *p*-value for association.

The consumption of alcoholic drinks significantly influenced the status of blood pressure. There were 47.4% and 55.3% of respondents who consumed alcohol and also had their respective systolic and diastolic pressure being uncontrolled. Although, the difference in proportion in the systolic controlled and uncontrolled groups was not statistically significant, the difference was significant for the diastolic pressure ($p = 0.014$). No form of health practice was significantly associated with the control of blood pressure.



4.2.3 Body size indicators and the status of BP

Body mass indices were defined based on the WHO classification, underweight (< 18.5), normal weight (18.5-24.9), overweight (25-29.9), and obese > 30. Waist circumference (WC) and thigh circumference (TC) for men and women were also put according to WHO standards as by Ul-Haq et al. (2014) and Heitmann and Frederikson (2009). Waist circumference in cm was categorized according to gender as normal (< 94 for males and 80 for females), overweight (94-101 for males, and 80.87 for females) and obese (for males > 102, and > 88 for females). Thigh circumference (TC) was classified according to risk of cardiovascular diseases (WHO, 1989) into high risk (TC less than or equal to 56cm for men and less than 68cm for women) and low risk (greater than 56cm for men and greater than 68cm for women). The findings of the chi-square test of association between participants anthropometrics characteristics and state of blood pressure (uncontrolled systolic and diastolic pressure) are presented in Table 4.13. Respondents who were overweight were in the lead with 37% for the uncontrolled systolic BP category, followed by those with normal BMI (34.6%). With regards to diastolic BP, a similar pattern of uncontrolled BP was observed; overweight (39.10%), normal (30.50%), obese (28.90%). The p values for this distribution however did not show statistically significant association between BMI and the status of blood pressure.

The results of the analysis for association between WC and status of BP did not show any significant association ($P = 0.174$ for men and 0.354 for women), with regards to systolic pressure. Similarly, there was no association between, category of WC and diastolic pressure ($P = 0.329$ for men and 0.496 for women). However, more of male participants who were obese had both their systolic (66.7% and diastolic (66.7%) being the most uncontrolled. More of women in the overweight category recorded uncontrolled systolic (34.3%) BP whilst more of



those who were obese recorded uncontrolled diastolic (35.5%). With regards to uncontrolled systolic pressure, both the overweight and obese respondents were equally represented (35.8%).

Table 4.13: Distribution of effects of anthropometric parameters (BMI, WC and TC) on the status of HBP

| Variable | | N° with uncon systolic BP (%) | | P | N° with uncon diastolic BP (%) | | P |
|-----------------------------------|--------------|----------------------------------|--------|-------|-----------------------------------|--------|-------|
| BMI | UW | 2 | (50.0) | 0.928 | 2 | (50.0) | 0.856 |
| | NW | 44 | (37.3) | | 39 | (38.2) | |
| | OW | 47 | (35.1) | | 50 | (38.2) | |
| | O | 34 | (34.3) | | 37 | (37.4) | |
| WC(cm) for male | N | 41 | (39.8) | 0.179 | 38 | (36.9) | 0.329 |
| | OW | 7 | (46.7) | | 7 | (46.7) | |
| | O | 4 | (66.7) | | 4 | (66.7) | |
| WC(cm) for female | N | 19 | (30.8) | 0.354 | 19 | (30.6) | 0.496 |
| | OW | 24 | (34.3) | | 23 | (32.9) | |
| | O | 24 | (31.6) | | 27 | (35.5) | |
| TC(cm) for male and female | Risky | 74 | (32.3) | 0.106 | 72 | (31.4) | 0.039 |
| | Less risky | 46 | (44.2) | | 46 | (44.2) | |
| TC(cm) for males | Highly risky | 11 | (29.7) | 0.076 | 10 | (27.0) | 0.153 |
| | Less risky | 39 | (46.4) | | 37 | (44.0) | |
| TC (cm) for females | Highly risky | 59 | (35.1) | 0.313 | 58 | (34.5) | 0.257 |
| | Less risky | 11 | (27.5) | | 11 | (27.5) | |

Where BMI= < 18.5 was underweight (UW), 18.5- 24.9 was normal weight (NW), 25-29.9 was overweight (OW) and ≥ 30 was obese (O). For WC= < 94cm for men and < 80cm for women was NW, 94-101cm for men and 80-87cm was OW and ≥ 102 cm for men and ≥ 88 cm for women was O. Also, with regard to TC, whilst ≤ 56 for men is highly risky for CVD and > 56 is less risky, ≤ 68 cm is high risk for CVDs for women and > 68 cm is less risky women but, TC uncategorised meant not qualified according to gender.

The Chi-square test showed that, when males and females together were considered, there was no association between TC and control of blood pressure in terms of systolic blood pressure, but there was an association between TC and diastolic BP (P = 0.039). There were 31.4% of participants who had smaller thighs and uncontrolled diastolic BPs compared with 44.2% who



had bigger thighs and uncontrolled diastolic BPs. This association was however lost when gender was controlled. There were proportionately fewer males and females with smaller thighs whose blood pressures were not controlled (Table 2.2.4 above).

4.2.4 Knowledge about hypertension and the control of high blood pressure (HBP)

Table 4.14 shows the results of the test of association between participants knowledge and status of high blood pressure.

Table 4.14: Effects of knowledge on the control of hypertension

| Variable | | N° with uncon systolic BP (%) | P | N° with uncon diastolic BP (%) | P |
|--|-------------|----------------------------------|-------|-----------------------------------|-------|
| Adequate knowledge | | 51 (38.3) | 0.468 | 50 (37.6) | 0.681 |
| Inadequate knowledge | | 77 (34.5) | | 79 (35.4) | |
| Is it beneficial to take alcohol? | Yes | 15 (50.0) | 0.045 | 17 (56.7) | 0.021 |
| | No | 101 (37.4) | | 99 (36.7) | |
| | Do not know | 12 (22.6) | | 13 (24.5) | |

Adequate knowledge was where respondents scored equal to or more than 50% on the questions asked, where a score below 50% was inadequate: N° is number with percentage (%) of respondent with uncontrolled BP.

Overall knowledge of respondents was categorized into adequate and inadequate knowledge using their score aggregate on specific questions on hypertension. Majority of the respondents who had inadequate knowledge had uncontrolled BPs; 77(60.2%) for uncontrolled systolic and 79(61.2%) for diastolic. However, overall knowledge did not show any association with the status of both systolic and diastolic blood pressure ($p=0.468$ for systolic; 0.681 for diastolic).

Participants specific knowledge on effects of alcohol on the management of high blood pressure was the only component of knowledge that showed a significant association with the



status of both systolic and diastolic pressure ($p = 0.045$ for systolic pressure and 0.021 for diastolic pressure). Most participants who thought it was beneficial to take alcohol had both their systolic (50.0%) and diastolic (56.7%) pressure not being controlled.

4.2.5 Effects of economic status on the control of high blood pressure

The results of the chi-square test for any association between participants cost of attendance to the health care facility for the control of hypertension showed that uncontrolled blood pressure was associated with high cost of attendance for health care.

Cost of round of attendance was categorized with reference to the national minimum income of 6 Ghana cedis (as at the time of data collection) into those who earned below or just above or equal to the minimum wage of 180 Ghana cedis per month. Out of the 243 (68.1%) respondents who were able to cost their round of attendance, 7 (70.0%), 5 (50.0%) of respondents whose cost of round of attendance was ≥ 180 had their systolic and diastolic blood pressures respectively, being uncontrolled compared to those who spent < 180 Ghana cedis in whom there was correspondingly 33.0% and 31.1% with uncontrolled systolic and diastolic blood pressures. These differences were statistically significant for systolic ($P = 0.037$) and border-line significant for diastolic ($P = 0.050$) indicating an association between cost of round of attendance and systolic B



Table 4.15: Association between economic status and the control of hypertension

| Variable | N° with uncon systolic BP (%) | | P | N° with uncon diastolic BP (%) | | P |
|---------------------------------------|----------------------------------|-----------|-------|-----------------------------------|--------|-------|
| Cost of attendance (Cedis) | < 180 | 77 (33.0) | 0.037 | 74 | (31.8) | 0.050 |
| | ≥ 180 | 7 (70.0) | | 5 | (50.0) | |
| Missed man hours (days) | 1 | 22 (52.4) | 0.018 | 20 | (47.6) | 0.381 |
| | 2 - 3 | 22 (27.2) | | 26 | (32.1) | |
| | 4 - 7 | 7 (23.3) | | 10 | (33.3) | |

N is number of participants with uncontrolled systolic and diastolic BPs with their percentages (%), and *p* is *p* value for association.

The Chi-square test for association indicated missed man hour was strongly associated with uncontrolled systolic blood pressure ($P < 0.018$). The results of the effect of attending to the condition showed that, there were more respondents who missed work for one day and also had their systolic BP (52.4%) and diastolic BP (47.6%), uncontrolled (Table 4.15). There was however no association between number of days they missed work and the diastolic pressure.

4.2.6 Compliance with treatment and the control of hypertension

The Chi-square analysis showed that of those who had their BP uncontrolled, 30.5% visited the healthcare facility for treatment when the need arose compared with 41.3% who did not visit when there was the need. This difference in proportions was statistically significant ($p = 0.033$). Most (43.2%) respondents who did not follow prescribed treatment had their diastolic BP uncontrolled. This attitude was significantly associated with status of diastolic blood pressure ($P = 0.028$).



Table 4.16: Association between participants' attitude towards treatment and the status of blood pressure

| Variable | | N° with uncon | | P | N° with uncon | | P |
|---------------------------------------|-------------------------------|-----------------|--------|-------|------------------|--------|-------|
| | | systolic BP (%) | | | diastolic BP (%) | | |
| Hospital visit | | | | | | | |
| When in need | Yes | 54 | (30.5) | 0.033 | 61 | (34.5) | 0.489 |
| | No | 74 | (41.3) | | 68 | (38.0) | |
| By prescription | Yes | 72 | (34.4) | 0.337 | 65 | (31.1) | 0.028 |
| | No | 55 | (37.7) | | 63 | (43.2) | |
| Missed to take medication | Yes | 62 | (36.3) | 0.986 | 59 | (34.5) | 0.786 |
| | No | 64 | (35.8) | | 68 | (38.0) | |
| How missed medication is taken | | | | | | | |
| | Immediately I remember | 37 | (35.9) | 0.921 | 36 | (35.0) | 0.486 |
| | At the prescribed time | 18 | (40.0) | | 13 | (28.9) | |
| | The next day | 7 | (35.0) | | 10 | (50.0) | |

N° is number of participants with uncontrolled systolic and diastolic BPs with their percentages (%) with regard to attitude towards treatment. P is asymptomatic significance

4.3 Predictive effects of factors affecting the control of hypertension

Effects of socio-demographic characteristics on the control of high blood pressure showed that, low income was a risk factor for uncontrolled BP, where income less than or equal to GH¢180 per month predicted the risk of uncontrolled BP with odds ratio (CI) = 0.434(0.23-0.84), (p = 0.013).

Body size, represented by anthropometric characteristics, and treated as continuous variables were assessed for any association with BP status using correlation analysis, and also for predictive effect on the BP of the respondents, using linear regression analysis.

The analysis of the results for the test of association indicated that, when males and females were considered together, there were positive and significant correlations between TC and systolic (0.139, p = 0.011) and diastolic (0.122, p = 0.026) BPs, respectively.



Results of the logistic regression analysis indicated that thigh circumference predicted a risk of uncontrolled BP. It showed that for both gender, $TC \geq 60\text{cm}$ was associated with a lower risk of uncontrolled systolic blood pressure (OR, CI)= 0.602(0.374-0.969, $p = 0.037$, and also uncontrolled diastolic pressure (OR, CI)= 0.578(0.359-0.932), $p = 0.024$. The test also showed that TC for males was also predictive of uncontrolled systolic BP (odd ratio (CI); 0.584(0.352-0.970), $P = 0.038$), showing that a TC less than 56cm was about 0.5 times less risky for control of HPT.

When the logistic regression analysis was used to test for the predictive effects of sociocultural practices on blood pressure status, alcohol consumption predicted a risk for uncontrolled diastolic BP with odd ratio (CI); 2.424(1.228-4.788), $p = 0.011$.

Overall, knowledge had no association with control of blood pressure. Meanwhile, the specific knowledge on whether alcohol is beneficial to take in hypertension predicted a risk for uncontrolled systolic pressure with OR (CI); 0.456(0.23-0.91), $p = 0.025$ and diastolic pressure OR (CI); 2.259(1.05-4.85), $p = 0.036$ (Table 4.20).

The cost of round trip of attendance was directly and significantly correlated with both systolic and diastolic pressures (0.152, $P = 0.017$; and 0.133, $P = 0.039$) (Table 4.17).

Spending above the daily minimum wage (above 180 Ghana cedis per month) for a round of trip of attendance predicted uncontrolled systolic blood pressure, with odds ratio (CI) = 0.212 (0.053-0.841), $P = 0.027$. This mean that people who spent more than 180 Ghana cedis per month were 0.5 time more not likely to control their blood pressure. Missing work, 2-3 days in a month predicted uncontrolled systolic blood pressure with odds of 3.614(1.28-10.23) and significant of 0.015.



Table 4.17: Factors that have predictive effect on the control of hypertension

| Variable | | Systolic BP OR (95% CI) | LR (P) | Diastolic BP OR (95% CI) | LR (P) |
|--|-------|----------------------------|--------|-----------------------------|--------|
| Income/month | < 180 | 0.543 (0.28-1.05) | 0.068 | 0.434(0.23-0.84) | 0.013 |
| TC(cm) for male and female | < 60 | 0.811(0.322-2.039) | 0.655 | 1.156(0.468-2.857) | 0.754 |
| | > 60 | 0.602(0.374-0.969) | 0.037 | 0.578(0.359-0.932) | 0.024 |
| TC (cm) for males | < 56 | 0.584(0.352-0.970) | 0.038 | 0.681(0.410-1.131) | 0.138 |
| | >56 | 0.488(0.214-1.114) | 0.089 | 0.470(0.202-1.094) | 0.080 |
| Take alcoholic drink | Yes | 30...(0.000-0.000) | 1.000 | 31...(0.000-0.000) | 1.000 |
| | No | 1.717(0.872-3.382) | 0.118 | 2.424(1.228-4.788) | 0.011 |
| Is it beneficial to take alcohol? | Yes | 0.456(0.23-0.91) | 0.025 | 0.522(0.27-1.02) | 0.057 |
| | No | 1.673(0.79-3.57) | 0.183 | 2.259(1.05-4.85) | 0.036 |
| Cost of attendance (cedis) | | | | | |
| | < 180 | 0.284(0.070-1.155) | 0.079 | 0.794(0.218-2.895) | 0.726 |
| | > 180 | 0.212(0.053-0.841) | 0.027 | 0.465(0.131-1.657) | 0.238 |
| Missed man hours (Days) | | | | | |
| | 1 | 2.008(0.82-4.90) | 0.126 | 1.123(0.50-2.53) | 0.779 |
| | 2 - 3 | 3.614(1.28-10.23) | 0.015 | 1.818(0.67-4.80) | 0.228 |
| | 4 - 7 | 1.225(0.46-3.26) | 0.684 | 0.945(0.39-2.31) | 0.902 |

Income, TC as thigh circumference, alcohol intake and the benefit, cost and missed work were variable factors at risk of uncontrolled BPs with OR(CI), LR and P; where OR is odd ratio, CI is confidence interval, LR is logistic regression and P is P-value.



CHAPTER V

DISCUSSION

As has been stated in earlier chapters of this thesis, this work was to study how sociocultural practices and other patient factors influence the control of high blood pressure. A questionnaire was used to collect data on participants' sociodemographic characteristics, sociocultural practices and knowledge on the disease. This Chapter summarises the results obtained and discusses these results in relation to previously published evidence, based on the specific objectives set up to answer the study questions.

5.1 Socio-demographic characteristics and the control of high blood pressure

With regard to WHO categorization of systolic and diastolic uncontrolled BPs to be of values less than or equal to 140/90mmHg, the 36.4% of participants with uncontrolled BPs, of which males, 40.2% for diastolic pressure accounted for more uncontrolled BPs, compared to their female counterparts with diastolic pressures (33.9%) and systolic pressure (20.8%). This is in consonance with the Addo et al. (2012) study in Ghana that showed high hypertension among men (33.4%) than women (28.9%). This observation was otherwise reported by previous studies in other African countries, such as in Algeria 31.2% vs. 25.7%; Botswana 37% vs. 28.8%; Mali 25.8% vs. 16.6%; female vs. males (Vijver et al., 2013). Musinguzi (2014) in a study in Uganda also reported that, isolated diastolic pressure was rather higher in women than in men, 43% vs. 40.8%. Also, Kjeldsen (2008) in a European study demonstrated high (50.2%) for men compared to 15% of women had uncontrolled BPs. However, as there was no



association ($P = 0.08$) between gender and BP control in the study by Goverwa et al., (2012), gender did not significantly influence the control of BP in this current study.

The effects of age on the control of BP was assessed by categorising age into non risk age (> 55 years for males and > 65 years for females), and risky age group (< 55 years for males and < 65 years for females). Although, there was a difference in the proportions of participants with uncontrolled systolic BP between the two age class (41.8% vs. 33.3%), this difference was not statistically significant to indicate an effect of age on the control of BP. In Ghana, the control of high blood pressure remained low among the old age even though, there was high awareness among them (Addo et al., 2012). According to Goverwa et al (2012), however, age above 65 years is associated with uncontrolled systolic blood pressure.

Considering income, more of respondents who either earned below or just the minimum wage of GH¢180 per month had their systolic (50%) and diastolic (75%) pressures being uncontrolled. Income was shown to be associated with uncontrolled diastolic pressure ($P = 0.011$). Income also had a predictive effect on uncontrolled diastolic pressure where an individual earning less or equal to GH¢180 was more likely to have uncontrolled BP, particularly, diastolic BP; odds ratio (CI) of 0.434 (0.23-0.84), $P = 0.013$.

Although, almost 100% of respondents were registered with the National Health Insurance Scheme (NHIS), not all drugs were covered by the scheme. The report on per capita income for the Northern Region of Ghana in 2008 by the Ghana Statistical Services (GLSS 5) cited a figure of GH¢296 with expenditure on food alone taking 51% (World Food Programme (WFP), 2012). With most participants earning less than the minimum wage, there is the likelihood that the prices of devices and medications to effectively manage blood pressure



would be out of the reach of many. This could explain why much more respondents had their BPs uncontrolled, since not all drugs were covered by the NHIS.

5.2 Common sociocultural practices associated with the control of blood pressure.

Common sociocultural practices in the Tamale metropolis were: religious practices such as Christianity, Muslim and Traditional religion; food habits; alcohol intake, smoking; health systems and practices; and media influences.

There were more than two religious beliefs practiced in the Tamale Metropolis with Islam being practiced by 247(69.4%) of the total number of hypertensives recruited. Many respondents practiced more than one faith health healing as a solution to their health needs. This 69.4% of muslims with high blood pressure is proportionately low when compared with 84% the muslim population in the Tamale Metropolis (Tamale Metro coordinating Unit Report, 2010). A possible reason for the high representation of Christians is that more of them may be accessing orthodox health care services than the other religious groups. Indeed the Christian population is reported to have increased from 13.7% in 2010 to 28.9% in 2014 (TMPCU, 2010).

The study showed that people in the Tamale Metropolis accessed more than one type of health practice with a greater percentage of respondents, 99.4% practicing orthodox health medicine, and was closely followed by those practicing faith healing. As stated by BeLue et al. (2009) and Abanilla et al. (2011), Traditional and Faith healers are always sought after for services of care, and all church leaders and health committee members were unanimous in their belief that their churches had a duty to address the spiritual and physical needs of their members through



effective health education, health screening and health-related activities through addressing their congregations about lifestyle practices. These are all done in a bid to reduce stress which ultimately promotes cardiovascular health. The promotion by the religious leaders of both orthodox health and faith healing health practices might have facilitated the high patronage of both practices among the population. Again, since the inception of the National Health Insurance Scheme in 2005, people have realized the ease of access and cost of health care services which could have encouraged people to register and increase the patronage of orthodox health practices.

From the current findings, more of the people (32.9%) were engaged in petty trading as an occupation. Other occupational groups were civil servants and health professionals. Participants were more into petty trading probably because of it being the available source of livelihood in this part of the country and the city. Tamale is also one of the developing urban cities, and its strategic location for movement of goods between the southern part of the country, and other Sahalian countries could have motivated people to take up petty trading.

Majority (77.7%) of participants in the study were married. This high proportion was expected of a Ghanaian society, where marriage is a highly respected institution. As part of the social norm in Ghanaian societies, marital status is recognized by many as a sign of adult maturity and a sign of responsibility (Atiemo, 2014; Franceour and Noonan, 2004; Salm and Falola, 2002). The observation is further supported by the fact that all participants in the study were adults.

With regards to food habits, maize has been the staple food for the people of the northern part of the country (Morris et al., 1999; WFP, 2012). The results of the current study shows that, not less than 95% of respondents frequently derived their carbohydrate foods from maize, which was eaten 7 days per week. Yam, another source of carbohydrate was taken frequently by



83.1% respondents. Maize, rice and yam remain the major staple carbohydrate foods consumed by majority of the people in Ghana including the Tamale Metropolis (Morris et al., 1999; Anang et al., 2011; WFP, 2012). Groundnut and palm used as oil were used by 57.9% and 44.7% respondents respectively in food. Almost every protein was eaten 1 day per week but, 94.4% respondents most often took fish as protein, whilst 66.0% often took beef. It has also been reported that household use oil three to four times a week to prepare food, and consume protein like fish and meat less than once in a week (WFP, 2012). In the current study, vegetables were frequently consumed by 22.8% of participants in four days in the week, agreeing with the World Food Programme report (WFP, 2012). This rate of consumption of vegetables is grossly inadequate.

Consumption of carbohydrate foods (both cereals and tubers) by almost everyone, five to seven days a week was inappropriate for good health. This is because it was less varied with other energy foods like legumes and protein, and other food nutrients from vegetables and fruits. The high carbohydrate consumption coupled with oil being the next source of energy, has overweight as a consequence. Additionally, as an urban and developing city like Tamale with these cheap foods such as rice, sugar and oil, due to the high poverty levels in the north people could consume inadequate foods leading to inadequate nutritional status. According to Agriculture and Consumer Protection by United Nations in corporate repository (FAO, 2008), consumption of sugary foods increase the palatability for consumption of fats, which in itself has the tendency of developing overweight and obesity, consequently high blood pressure from metabolic syndrome in obesity (Reddy et al., 2004; Kjeldsen et al 2008; CDC, 2012; Alfadda, 2014). Furthermore, only vegetables and fruits consumption, 4 and 2 days per week were in consonance with the WFP study on borderline insecure household consumers (WFP, 2012). The daily consumption of the different types of foods was just inadequate particularly the



requirement of 5 servings per day from fruits and vegetables as recommended in Vijver et al (2013) study.

Most (64.3%) participants engaged in less than moderate physical activity such as brisk walking, with a few, 24.5% respondents who did jogging and bicycle riding as moderate physical activity. Participants were mostly elderly and at that age jogging, bicycle riding or weight lifting would not be attractive to them leading to many resorting to brisk walking.

Few participants, 10.7% took alcoholic drink, probably due to majority being Muslims, whose religion regard intake of alcohol as a taboo. Studies on alcohol consumption have shown its risk associated with CVDs, where particularly from randomized control trials it is suggested that alcohol monotonically increases blood pressure, (Yeung et al., 2013). This may be due to the fact that alcohol contributes to overweight and obesity, all of which can lead to high blood pressure.

With a representation of 3.4%, the proportion of respondents who smoked tobacco was low. The advertisement on the health risk of tobacco smoking or snuffing has been on the media for a long time which might have influenced this reduction in smoking. Hitherto, there have been reports that tobacco smoking is high {averagely (6.2%)}, 8.8%, 10.8% in parts of Ghana, compared to where the study was undertaken (Owusu-Dabo et al., 2009; Pampel, 2008). Besides, almost three quarters of participants were muslims, a group that frowns on the use of intoxicants, including tobacco.



5.2.1 Effects of sociocultural practices on the control of hypertension

Of all the study participants, those who used Traditional health practices in times of disease had the most uncontrolled systolic BP (43.3%). This difference was however, not statistically significant. Apart from the traditional healers being incorporated into the health system to make it pluralistic health system in Ghana and in Zimbabwe, faith health healers are also sought for to address hypertension and diabetes problems in times of desperation (BeLue et al., 2009; Aikins et al., 2010; Goverwa et al., 2012).

The types of foods eating among the study sample were energy foods such as maize and yam, and also groundnut, beef and beans. Taken in food groups as carbohydrate, oils and proteins, the consumption of these food groups were not associated with uncontrolled blood pressure. With the protein group, however the consumption of fish influenced the control of blood pressure, where there was a great and significant difference between respondents who took fish and had uncontrolled diastolic pressure (34.5%) and those who did not take fish (65.0%), $P = 0.006$). This was observed in the reduction of high blood pressure (HBP) or hypertension by diet like Mediterranean diet, which from the fish, contains high levels of omega-3 unsaturated fatty acids. It has been shown that, the consumption of this Mediterranean diet or fish by hypertensive patients reduced their HBP levels (Kris-Etherton et al., 2002; Dontas, et al., 2007).

There was an association between frequent consumption of fruits (5 days per week) and reduced risk of uncontrolled systolic pressure with odds ratio (CI); 0.357 (0.137-0.930), $P = 0.035$. It has been reported by Hall et al (2009) that, the consumption of fruits and vegetables is not common among Ghanaian populations (36.6% among men 38.0% among women) as



compared to inhabitants of middle income countries (77.6% for men and 78.4% for women). In theory, excess intakes of energy foods without the consumption of the required levels of fruits and vegetables (5 servings of fruits and vegetables per day) have been identified as risk factor for cardiovascular diseases including a state of unyielding treatment of raised blood pressure (Vijver et al., 2013). Roeters van Lennep et al (2001) have shown that elevated total cholesterol and LDL-C levels which may be linked to poor intake of fruits and vegetables are major risk factors for cardiac heart disease (CHD). These have been blamed on overweight and obesity leads to development of excess cholesterol and low density lipoprotein levels that leads to development of atherosclerosis which results in high blood pressure.

The analyses of the BMI data for the current study indicated that more of the participants who showed uncontrolled BP were overweight. Although general body fat and abdominal fat were not measured in this study, the BMI values suggest a high fat level in the study sample. The contribution of body fat to the difficulties encountered in the control of blood pressure has been reported by other authors of previous studies. It has been demonstrated that excess fat accumulation leads adipocytes dysregulation of the production of adipokines (adiponectins) in obesity, and visceral obesity leads to hypertension resulting from complications like insulin resistance, hyperlipidemia (Akpalu et al, 2011; Sakane et al, 2013; Alfadda, 2014).

Fruits and vegetables are known to contain adequate levels of minerals and vitamins (antioxidants) and are recommended to be taken as five servings a day (Vijver et al, 2013). The observed consumption of fruits and vegetables by the participants in the current study, which was in most participants as low as once a day and four days in a week will not be enough to contain sufficient potassium required for a day (90mmol) and also antioxidants needed to neutralise free fatty acids, to prevent the risk of CVDs or CAD such as hypertension.



Alcohol consumption was shown in this study to significantly influence the control of raised blood pressure where a higher proportion of participants (55.3%) who had uncontrolled systolic BP took alcohol compared to 47.4% of same who did not consume alcohol ($P = 0.014$). Additionally, alcohol consumption had a predictive effect, especially on uncontrolled diastolic blood pressure {OR (CI) of 2.424 (1.228-4.788; $P = 0.011$). the consumption of alcoholic drinks might have contributed to high level of BMI, overweight and obesity that were observed. The effect of alcohol consumption on the level of blood pressure is reported to be varied and depend on the levels of consumption. Studies by Addo et al., (2012) indicated chronic alcoholic consumption was associated with difficulty in the control of Hypertension. Kjeldsen et al (2008) indicated that up to 8.4% of alcohol consumed as part of one's meal was required to show an associated with uncontrolled BP ($P = 0.018$). It has also been demonstrated that alcohol consumption has a turned U shape link with health, where moderate intake (1 to 2 drinks per week, that is, 10 to 20g) of alcohol protects against CVDs, whilst higher than this amount negatively associated with ischaemic heart disease and stroke (Puddy and Belin, 2006); Yeung et al, 2013).

5.3 Effects of body size indicators on the control of high blood pressure

Body size indicators have been shown to be strongly linked to cultural practices such as physical exercise and eating habits (Myers, 2003; FAO, 2008; and Stamatakis et al., 2011). Body size in this study was determined using anthropometric parameters as body mass index (BMI), waist circumference (WC), and thigh circumference (TC).



The findings on the three categories of body size indicators (BMI, WC, TC) indicated thigh circumference influenced the control of blood pressure.

The Pearson's correlation analysis showed that, TC was positively correlated with both systolic (0.139) and diastolic (0.122) pressures with statistical significance of ($P = 0.011$ for systolic pressure, and 0.026 diastolic pressure) when both sexes were put together. The difference in proportion of participants with uncontrolled diastolic BP in high risk (31.4%) and low risk (44.2%) TC category was statistically significant ($P = 0.039$). Unlike this study, in the Heitmann and Frederikson (2009) study, participants with small TC (<60cm for both sexes) was associated with CVDs (both systolic and diastolic high pressures) where above this threshold the association between big thigh and status of blood pressure control was no longer predictable. Predicting the risk of big TC indicated an increased risk for uncontrolled blood pressure with OR (CI); $0.602(0.374-0.969)$ and $0.578(0.359-0.932)$, $P = 0.024$ and $P = 0.037$, for respondents systolic and diastolic pressures respectively. However, Hietmann and Frederikson (2009) study, reported an increased risk for CVDs (high blood pressure) was associated with small TC. When gender was considered, male TC alone showed a linear and positive correlation with both systolic (0.007) and diastolic (0.018) pressures. TC was also the only category that had a predictive risk for uncontrolled systolic BP of OR (CI); $0.584(0.352-0.970)$, $P = 0.038$. This was true in the Heitmann and Frederikson (2009) study for systolic pressure but not for diastolic pressure.

5.4 Effects of knowledge on the control of hypertension

Knowledge was assessed based on specific issues regarding hypertension, and was also considered overall, as an aggregated of the specifics. Of the entire 62.6% (223) of respondents who had inadequate knowledge, 60.5% (77) and 61.2% (79) had their systolic and diastolic



pressures, respectively uncontrolled. This difference in proportions was however not statistically significant indicating a lack of influence of overall knowledge on the control of BP.

With regards to specific knowledge, it was only knowledge on the benefit of alcohol that was associated with the control of raised blood pressure. A higher proportion of respondents who had the wrong knowledge that taking alcohol was beneficial in the control of BP had their systolic and diastolic blood pressures being uncontrolled compared to those who did not have this wrong knowledge (50% vs. 37.4%; $P = 0.045$, for systolic and 56.7% vs. 36.7%; $P = 0.021$, for diastolic). Knowledge that alcohol was beneficial strongly did not protect against uncontrolled systolic pressure, OR, CI; 0.456(0.23-0.91), $P = 0.025$. This may be explained by the fact that, once the individual harbours this wrong knowledge, there would be little commitment towards any effort to stop the habit of consuming the substance. The effect of alcohol consumption on over-soring BP status, and therefore its challenge on the treatment of the condition has been reported earlier (Puddy and Beilin, 2006).

5.5 Economic effects and the control of hypertension

The economic effect was assessed using cost of visit to the facility and man hours. The effects of cost of attendance to the health facility and missed man hours were found to be associated with the control of BP ($P = 0.037$ and 0.018 , respectively). Additionally a high cost of attendance (that is, spending more or equal to 180 Ghana cedis (GH¢180) predicted a risk of uncontrolled systolic BP {OR (CI); 0.212(0.053-0.841), $P = 0.027$ }. Cost of round of a visit to the health facility included all possible cost incurred on the trip such as cost of transportation, medications bought outside of the NHIS provisions, and feeding. Of participants who had uncontrolled systolic BP, more (70%) spent more than or equal to the monthly minimum wage



of GH¢180 in a round visit to the facility for health care services. As attending clinic has a high likelihood of enhancing compliance with treatment regimen, a high cost of visit may militate against controlling BP. A similar finding has been reported by Bosu (2010), who demonstrated that inadequate control of hypertension was linked to low compliance due to high cost associated with drugs leading to default. He also linked this inadequate control to the; availability of pluralistic health practice, as we have also observed in this current study. Although we did not assess the availability of medicines on the NHIS, there are reports to the effect that medicines are at times not readily available and patients have to acquire them out of their pocket (Hashmi, 2008; Addo et al., 2012; Bosu, 2013; Goverwa, et al., 2012). An expenditure of this kind has the effect of raising the cost of visit which invariable can discourage adherence to treatment regimens in this region of the country where poverty is endemic (WFP, 2012).

5.6 Compliance with treatment and the control of HBP

Compliance with approved and recommended treatments has always been known to lead to favourable outcomes of diseases. However, in an environment where there are different treatment options, they may be different levels of compliance with recommended treatments that may influence effective control of a particular disease condition.

Participants were scheduled to visit the health facility at least once in every month. In response to when respondents visited the facility or hospital instead of the scheduled time, the difference in proportion between those with uncontrolled systolic blood pressure who only visited when they thought there was the need (69.5%), and those who visited as scheduled (41.3%) was statistically significant ($P = 0.033$). Treatments includes medicines which help to keep high



blood pressure under control, education on the type of habits to cultivate, such as, how to stick to prescribed hypertensive drugs, foods to avoid, rest or type of physical exercise.

In terms of compliance with treatment, a positive attitude towards the use of prescribed medicines contributes a great deal to patient's adherence. Following prescribed treatment as a whole was very necessary to reduce HBP as there were fewer participants from those who followed prescribed treatment and had uncontrolled diastolic pressure (31.1%), compared to those who could not follow recommendations and had uncontrolled diastolic pressures (43.2%). This difference in proportion was statistically significant for diastolic pressure ($P = 0.028$), but not for the systolic pressure.

Furthermore, most (50.0%) of those who took their medicines the next day after missing to take it at the right time had their diastolic pressures more uncontrolled. Those who followed prescribed treatment including those who went to the health facility when the need arose were among those with least uncontrolled BP (systolic 30.5% and diastolic 34.5% respectively). It is clear from the analysis that client's attitude could be a problem in the control of blood pressure. Inadequate control of hypertension has previously been linked to non compliance with treatment (Bosu, 2010).



CHAPTER VI

CONCLUSION AND RECOMMENDATION

As has been stated earlier, this study was conducted to access the factors that influence the control of raised blood pressure among established hypertensives. A cross-sectional survey was carried out among patients visiting the Tamale Teaching Hospital for care between February and March 2014.

6.1 Main findings

The findings from the study indicated that majority of respondents (62.9%) were females, 51.5% had some form of education, and many were traders (32.9%). Almost eighty participants were married (77.5%) and more than half were muslims (69.4%). The main outcome measure, which was the status of blood pressure, showed that in all more females, 33.9% of patients had their diastolic pressure uncontrolled, whereas more males (41.2%) systolic pressures were uncontrolled. Of the body size indicators, only thigh circumference was associated with uncontrolled blood pressure.

Intake of fish and alcohol indicated an association with the status of diastolic pressure ($P = 0.006$ and 0.014 respectively). As low as 37.4% respondents had adequate knowledge about hypertension but, a higher percentage, 86.7% knew that taking prescribed medications can help reduce high blood pressure (HBP). Knowledge in general did not affect the control of BP with specifically knowledge on effects of alcohol showing an association and was highly predictive of uncontrolled systolic BP ($P = 0.025$).



Almost every participant (96.9%) was insured by the National Health Insurance Scheme which influenced majority (83.7%) routine visit to the hospital once a month. More of them spent GH¢1-50 on a round trip to the health facility, where cost was associated with uncontrolled systolic pressure. Many participants, 86.5% went to hospital when their blood pressure was high, and also a high percentage (72%) patronised pharmacy with 90.4% adhering to prescribed meals in addition to drugs. Visiting the hospital when the need arose and following prescribed medication as recommended were all associated with uncontrolled BP, ($P = 0.033$ and 0.028 respectively).

6.2 Study limitations

Although a cross-sectional survey was used some questions required a good memory of participants to provide appropriate responses. A prospective study would have ensured that biases that may be due to difficulty in recall are reduced.

The study involved both elite and non-elite participants in terms of knowledge about condition and language difference. Where there was the need to translate English language to the local languages with respect to scientific terminologies and ways of presenting questions, there are likely to be problems. Prediction of risk using the binary logistic analysis did not correct for the effect of level of education, which could have masked education as a strong predictor of risk in the control of hypertension.



6.3 Recommendation

Drawing from the main findings the following recommendations are made to help control high blood pressure:

Government in collaboration with the media should provide health education to the public on hypertension, its risk factors, its effects, and media influences on the condition, especially on the effect of smoking and alcohol on the management of the condition. Education should be extended to the cultivation of appropriate life style habits such as sticking to one health practice at a time, appropriate diets and moderate or avoid consumption of alcohol.

Health authorities, Ghana Health Services (GHS) and Ministry of Health should embark on the education of the public to consume foods with protein, protein like fish that contain omega-3 fatty acids, fruits and vegetables. There is also the need for government to ensure importation of less or discourage fatty, polish, refined, and salty foods.

Government needs the laws in placed to function by ensuring qualified health practitioners are within the health system, and practices are up to the standard quality in order to provide the needed health services to hypertensives and the public at large. Importation and marketing of foods, drugs and other substances like alcohol must be displayed with labels with alcohol in particular indicating the risk involves in its consumption. The food and drug regulatory agency must be equipped to carry out surveillance to ensure healthy products are consumed by people. It is important for government to collaborate with pharmaceutical agencies, and also provide subsidies in order to acquire enough antihypertensives and those medicines that are not included on the National Health Insurance Scheme but are expensive.

Health professionals need to be trained on sociocultural practices by the people of the metropolis and the whole nation at large. The training should also include their attitude towards



management of hypertension, to enable the professionals to continue adopting an improved ways of managing, educating and counselling their clients at the hospitals and clinics.

6.4 Future directions

In view of the findings concerning knowledge, life style like alcohol intake and inadequate attitude on the management of hypertension there is the need for the higher institutions like universities, research institutions, interested private sectors and the government to engage on more research into areas of future work on the control hypertension that may include:

The assessment of factors that affect the adherence of medicines used in the management of patients with high blood pressure.

Research could also be conducted to assess the most appropriate mode of information delivery to the individuals battling with high blood pressure.

It would also be worthwhile to evaluate the impact of social support in the management of raised blood pressure.

6.5 Conclusions

Finally, the findings of the study have led to the following conclusions;

The rate of uncontrolled blood pressure was 36.3 % for uncontrolled systolic pressure and 36.2% for uncontrolled diastolic pressure. Females had both their systolic and diastolic blood pressures more uncontrolled but, this was higher for systolic pressure (66.1%) than the male counterparts with 59.8%.



The common sociocultural practices included; religious practices such as Islam, Christianity and Traditionalist. The people were associated with health systems and practice, and accessed health needs from the orthodox, the traditional and mixed of faith healing health services. Other practices were food habits, alcoholic intake, smoking and media influences. Of the sociocultural practices, the consumption of alcohol and eating habits, where less fish was consumed influenced the control of raised blood pressure. Although, fish consumption was inadequate there was an association between the consumption and the control of BP status. As a risk factor, the consumption of alcohol predicted about two times the likelihood of uncontrolled BPs. There was less than average level of knowledge about the disease, and overall inadequate knowledge did not influence the control of blood pressure. However, not knowing specifically that intake of alcohol was not appropriate in hypertensives, strongly affected the control of raised blood pressure.



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Appendices

Appendix 1

UNIVERSITY FOR DEVELOPMENT STUDIES
(School of Medicine and Health Sciences)

DEPARTMENT OF ALLIED HEALTH SCIENCES

Tel: 03720 - 93295

1883

Our Ref:

Your Ref:

P.O. Box

Tamale, Ghana



QUESTIONNAIRE

Title: Assessing the role of sociocultural practices on uncontrolled hypertension among adults in Tamale Metropolis

By: Isaac AlhassanYarindow

RESPONDENT ID NO:.....

DATE:.....



CONSENT

You are kindly invited to participate in this research aimed at evaluating the role of sociocultural practices on uncontrolled hypertension among patients within the Tamale Metropolis. This research is in partial fulfilment of the requirements for the award of MSc/MPhil in Community Health and Development at the University for Development Studies.

All information collected will not be identifiable to ensure complete confidentiality and anonymity of respondents is guaranteed. Kindly answer the questions freely and truly. Refusal to take part in the research will not prevent or affect any treatment you would receive.

Participation is willingly responding: YES or NO

Thank you for your consent and participation.

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

1. Blood pressure reading today- Systolic.....Diastolic.....
2. Age.....
3. Weight
4. Height
5. BMI.....
6. Waist circumference.....
7. Thigh circumference.....
8. Gender
 - a. Male []
 - b. Female []
9. Is there any family member with high blood pressure?
 - a . Y e s []
 - b . N o []
 - c . Do not know []
10. Educational level



- a. No formal []
- b. Non- formal []
- c. Basic []
- d. Secondary []
- e. Tertiary []

11. Occupation

- a. Trader []
- b. Farmer []
- c. Civil servant []
- d. Health professionals []
- e. Others specify

12. Religion

- a. Muslim []
- b. Christian []
- c. Traditional []
- d. Others

13. Marital status

- a. Married []
- b. Single []
- c. Separated []
- d. Divorced []
- e. Widowed []

14. Monthly income level.....

SECTION B: SOCIOCULTURAL PRACTICES

1. Which of the following do you practice? Tick as many as you do

- a. Traditional health practice []
- b. Orthodox health practice []
- c. Faith healing health practice []

2. How do you treat high blood pressure (HBP)? Tick as many as you do.



- a. Traditional faith healing []
- b. Muslim faith healing []
- c. Christian faith healing []

3. What type of foods do you eat frequently in each case below? Tick as many as you do.

- a. Cereals- Maize [], Rice [], Millet [], Sorghum []
- b. Tubers- Yam [], Cassava [], Plantain [],
- c. Oil- Groundnut [], Refine palm [], Refine vegetable [], Palm [],
- d. Animal protein- Beef [], Mutton [],
Chicken [], Kobi [], Fish []
- e. Plant protein- Groundnut [], Beans [], Peas [],

4. Tick appropriately as many times you do eat weekly, the following foods in each case.

- a. Cereals- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- b. Tubers- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- c. Sugar- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- d. Groundnut- One day [], Two days [], Three days [], Four days [], Five
days [], Six days [], seven days []
- e. Oil – One day [], Two days [], Three days [], Four days [], Five days [], Six
days [], seven days []
- f. Chicken- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- g. Eggs- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- h. Beef- One day [], Two days [], Three days [], Four days [], Five days [], Six
days [], seven days []
- i. Mutton- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []
- j. Fruits- One day [], Two days [], Three days [], Four days [], Five days [],
Six days [], seven days []





k. Vegetables- One day [], Two days[], Three days [], Four days[], Five days[], Six days[], seven days []

5. What kind of daily exercise do you engage in? Tick as many as you do

- a. Bicycle riding []
- b. Jogging []
- c. d. None []
- d. Brisk walk []
- e. Specify any others, .

6. Do you take alcoholic drinks?

Yes []

No []

7. Do you smoke/snuff tobacco?

Yes []

No []

8. From which of the following source(s) do you access medicines to manage your sickness? Tick as many as you do.

- a. Hospital/community Pharmacy []
- b. Licensed chemical shop []
- c. H e r b a l i s t s []
- d. S e l f m e d i c a t i o n []
- e. D r u g p e d d l e r s []

9. Do you get information from media adverts to manage your condition?

Yes []

No []

10. If Yes, how do you benefit from the media advert? Tick as many as you do.

- a. Help me decide on the medication []
- b. Help me decide on the source of medication []
- c. Help me decide on the type of medication []



SECTION C: KNOWLEDGE ON HYPERTENSION AND RISK FACTORS

11. At what values do they say your blood pressure is high?
- a. HBP>120/80 mmHg []
 - b. HBP>130/90 mmHg []
 - c. HBP>130/100 mmHg []
 - d. HBP>140/90 mmHg []
 - e. Do not know []
12. Do you think HBP can be cured?
- a. Yes []
 - b. No []
 - c. Do not know []
13. HBP can be reduced by? Tick as many as you know.
- a. Taking prescribed medications regularly []
 - b. Taking medications regularly []
 - c. Only exercising regularly []
 - d. Medication and regular exercise []
 - e. Herbal preparations []
14. Which of the following practices can make the control of raised blood pressure difficult? Tick as many as you know.
- a. Lack of exercise []
 - b. Emotional state []
 - c. Beliefs []
 - d. Alcohol intake []
 - e. Type of diet []
15. Which of the following foods can make the control of raised blood pressure difficult? Tick as many as you know.
- a. Fast foods []
 - b. Oily foods []
 - c. Sugar foods []



d. Salty foods []

e. Refine foods []

16. Which of the following lifestyles make it difficult to control hypertension? Tick as many as you know.

a. Lack of socialization []

b. Use of cars as a regular means of transport []

c. Lack of leisure time []

d. Inadequate exercise []

e. Do not know []

17. Which of the following conditions make it difficult to control hypertension? Tick as many as you know.

a . F e v e r []

b . D i a b e t e s []

c . O v e r w e i g h t []

d . O b e s i t y []

e. D o n o t k n o w []

18. Which of the following psychological conditions are risky to developing hypertension? Tick as many as you know.

a . B e r e a v e []

b . D e p r e s s i o n []

c . B e l i e f s []

d . M o o d []

e . S t r e s s e s []

19. Does taking fruits appropriately help in controlling HBP?

a . Y e s []

b . N o []

c . D o n o t k n o w []

20. Does taking vegetables appropriately help in controlling HBP?

a . Y e s []

b . N o []

c . D o n o t k n o w []





21. What means of transport is risky to developing hypertension? Tick as many as you know.
- a. Walking
 - b. Car
 - c. Motor cycle
 - d. Bicycle
 - e. Do not know
22. For how long does one need to engage in fitness activity daily to control HBP? Tick as many as you know.
- a. 30 mins
 - b. 10 mins
 - c. 2 hours
 - d. None
 - e. Specify other times
23. Which of the following activities do you think can worsen your HBP? Tick as many as you do.
- a. Watching TV for long hours
 - b. Hard work
 - c. Sitting long hours for little stressful activity
 - d. Playing games as cards, draft
 - e. Playing games as tennis ball, valley ball
24. Is socialization a risk to development of hypertension?
- a. Yes
 - b. No
 - c. Do not know
25. If Yes, how important is socialization a risk factor to developing hypertension? Tick as many as you know.
- a. Could reduce social support
 - b. Could reduce financial support
 - c. Could reduce psychological support stresses
 - d. Could reduce access to health care services
 - e. Do not know

26. Is it necessary to take alcohol?

- a . Y e s []
- b . N o []
- c . Do not know []

27. If Yes, What amount of alcohol is necessary to take in a day?

- a. 10g and 40g (1unit and 4units) for women and men respectively []
- b. <20g and <30g (<2units and <3units) for women and men respectively []
- c. <40g and <50g (<4units and <5units) for women and men respectively []
- d. <60g and <70g (<6units and <7units) for women and men respectively []
- e. Do not know []

28. Can smoking/snuffing tobacco affect the control of HBP?

- a . Y e s []
- b . N o []
- c . Do not know []

29. Do you think adverts on drugs used for treatment of illness like diabetes, high blood pressure and overweight are risky to developing hypertension?

- a . Y e s []
- b . N o []
- c . Do not know []

30. If Yes, how risky is it in Q 30 above?

- a. Most adverts do not listen to complaints before []
- b. Questions are not asked in most cases of advert in respond to health problems []
- c. Encourage self medication from counter buying without proper guidance []
- d. Could worsen the hypertensive condition []
- e. Contributes to uncontrolled situation of hypertension []





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139

SECTION D: EFFECTS OF SOCIOCULTURAL PRACTICES ON THE OUTCOME OF UNCONTROLLED HBP

31. How many times do you seek for attention to manage your condition?
- a. Once a week
 - b. Thrice a week
 - c. Once a month
 - d. Once in two weeks
 - e. four times a week
32. How much on average do you spend in each round of attendance for service?
- a. Cost of transport...
 - b. Cost of purchased drugs
 - c. NHIS
 - d. Cost of food...
 - e. Cost of consultation.....

33. How often do your condition prevent you from work in a month?

Ans...

34. Which of the following do you face as a result of your HBP? Tick as many as you experience

- a. S o c i a l i s o l a t i o n
- b. S e l f i s o l a t i o n
- f. T h r e a t a t w o r k s i d e
- g. A v o i d a n c e o f s o c i a l f u n c t i o n s
- h. m i s s e d w o r k

SECTION E: COMPLIANCE WITH TREATMENT OF HYPERTENSION

35. When do you seek attention for health care services for your problem?
- a. W h e n f e e l i n g s i c k
 - b. A p p o i n t m e n t b y t h e p r e s c r i b e r



c. Whenever necessary []

36. How many times do you seek attention from the clinic/hospital to manage your condition?

- a. Once a month []
- b. Twice a month []
- c. Thrice a month []
- d. Thrice a month []
- e. Once in two months []

37. What source of medicine do you seek to manage your condition? Tick as many you do.

- a. Self medication []
- b. Pharmacy []
- c. Chemical licensed shops []
- d. Health professionals []
- e. Herbalist []

38. Do you sometimes miss taking your medication for your HBP at the prescribed time?

Yes []

No []

39. If Yes, how do you take the missed medication?

- a. Immediately I remember []
- b. At the next prescribed time []
- c. The next day []
- d. Taken missed dose together with next dose prescribed time []
- e. Specify

40. Apart from drugs, what other things do you do to manage your condition?

- a. Stop smoking []
- b. Eating fruits and vegetables []
- c. Stop intake of alcohol []
- d. Eating prescribed meals []
- e. Specify others .

THANK YOU.



Appendix II

UNIVERSITY FOR DEVELOPMENT STUDIES (School of Medicine and Health Sciences)

Tel: 03720-93295

Our Ref:
Your Ref:
LTDS/C11D/0113/12



P.O. Box 1883
Tamale, Ghana

Date: 5106/2014

Department of Allied Health Sciences

TO WHOM IT MAY CONCERN.

Dear Sir,

LETTER OF INTRODUCTION

I write to introduce to you an MPhil Community Health and Development student of the Department of Allied Health Sciences, School of Medicine and Health Sciences of the University for Development Studies: **MR. YARINDOW ALHASSAN ISAAC.**

He is under studying a research topic, entitled: "**ASSESSING THE ROLE OF SOCIOCULTURAL PRACTICES ON UNCONTROLLED HYPETENSION AMONG ADULTS IN TAMALE**".

Kindly assist him to collect the appropriate data to answer his research questions.

Thank you_

Yours sincerely,

|
Dr. Robe 1 Kuganab-Lem
(Head of Department)



Appendix III



**Department of Research & Development
Tamale Teaching Hospital**

TTH/R&M/SR/13/75
12/06/2014

TO WHOM IT MAY CONCERN

**CERTIFICATE OF AUTHORIZATION TO CONDUCT RESEARCH IN TAMALE
TEACHING HOSPITAL**

I hereby introduce to you **MR. YARINDOW ALHASSAN ISSAC** final year MPhil Community Health and Development student of the Department of Allied Health Sciences, School of Medicine and Health Sciences, who have been duly authorized by Management to conduct a study titled, "**ASSESSING THE ROLE OF SOCIOCULTURAL PRACTICES ON UNCONTROLLED HYPETENSION AMONG ADULTS IN TAMALE**".

Please accord them the necessary assistance to be able to complete their study work. If in doubt, kindly contact the Research Unit at the HR Office or on Telephone 0243233840. In addition, kindly report any misconduct of the Researcher to the Research Unit for necessary action, please.

Thank You.


HUSSEIN HAWAWU
HEALTH RESEARCH OFFICER
For: DD (RESEARCH & DEVELOPMENT)

