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MANAGEMENT OF HYPERTENSION BY PATIENTS ATTENDING THE KORLE-BU POLYCLINIC

BY

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DECLARATION

I hereby certify that with the exception of the references made to other people's work which have been duly acknowledged, this work is the result of my own research work done under supervision and that this dissertation has not been presented to any other body for publication or examination purposes.

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Signature……. Date…….

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(STUDENT)

Signature……. Date……

DR. EMMANUEL ASAMPONG

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DEDICATION

I dedicate this dissertation to Almighty God for how far He has brought me and to my family, for the support and love. I love you guys.

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LIST OF ACRONYMS

ABPM	Ambulatory Blood Pressure Monitoring
ACEI	Angiotensin Converting Enzyme Inhibitors
ANOVA	Analysis of Variance
ARB	Angiotensin Receptor Blockers
BMI	Body Mass Index
BP	Blood Pressure
BRFSS	Behavioural Risk Factor Surveillance Study
CI	Confidence Interval
DASH	Dietary Approach to Stop Hypertension
HBM	Health Belief Model
HBPM	Home Blood Pressure Monitoring
HTN	Hypertension
JNC	Joint National Committee on Hypertension
KBTH	Korle Bu Teaching Hospital
kg/m^2	kilograms per meter square
MMAS	Morisky Medication Adherence Scale
mmHg	Millimetres of mercury
MOH	Ministry of Health
NHIS	National Health Insurance Scheme
NICE	National Institute Clinical Excellence
NSAID	Nonsteroidal Anti- Inflammatory Drugs
OCP	Oral Contraceptives Pills
ORs	Odds Ratios
WHO	World Health Organisation

ABSTRACT

Background: Hypertension is a common chronic non-communicable disease condition and as such takes a toll on the family and the community. Individuals with hypertension should take responsibility for their condition as this would improve blood pressure control. They should be motivated to adhere to medication, but this is not so. Hence, this study was done to assess how patients with hypertension attending Korle Bu Polyclinic managed their condition.

Methods: This was a descriptive cross-sectional survey, which recruited a total of 191 participants from the Korle Bu Polyclinic. A Semi-structured questionnaire was used to assess demographic characteristics, history and belief of hypertension. Morisky's Medication Adherence Scale (MMAS-8) was used to assess adherence to antihypertensive medications. Chi square, fisher exact test and logistics regression were used to test for associations using STATA 13.

Results: There were 46 (23.59%) male participants, giving a male:female ratio of about 1:3. The mean age of the participants was 60.98±12.99 years and 74.36% had a Family history of hypertension. The majority of the participants (52.82%) were low adherers, 46.67% were moderate adherers while 0.51% respondents were high adherers. The majority of the participants (60.51%) had controlled blood pressure. The most common reasons attributed by participants to non-adherence were cost of medications (38.46%), access to medication 59 (30.26%) and forgetfulness 21 (10.77%) respectively. Overall, knowledge and perception of hypertension were good.

Conclusion: Though majority of the participants were low adherers, this did not reflect on the blood pressure control. More research needs to be done to further explore this.

Keywords: Blood pressure, Hypertension, Adherence, Barriers, Health Belief Model

CHAPTER ONE

INTRODUCTION

1.1 Background

Hypertension is one of the most common chronic non-communicable diseases diagnosed worldwide (WHO, 2009a). It is a common public health cause of morbidity and mortality with a global prevalence of 40% in adults over 25 years. Its prevalence differs worldwide and Africa, contributing the greatest numbers (WHO, 2013). An increase in the ageing population globally has resulted in a population who are at higher risk of chronic non-communicable diseases like hypertension (Mckeown, 2009; Omran, 2005). In future, it is anticipated that, a third of sub-Saharan Africa population will have hypertension and almost 75% of all deaths in this sub region will be attributable to hypertension (Kearney, Whelton, Reynolds, Whelton, & He, 2004).

Hypertension is sustained elevated systolic blood pressure of 140 mmHg and above and/or diastolic blood pressure of 90 mmHg and above (NICE, 2011). The risk factors for hypertension are the black race, ageing, inactive lifestyle, obesity, and deleterious use of alcohol. Unfortunately, the complications of this condition are more in low and middle-income countries where health systems have multiple challenges resulting in an overwhelming burden to the individual, family and the community at large (WHO, 2013).

Uncomplicated hypertension rarely causes symptoms, however, when undiagnosed or not adequately managed it results in several cardiovascular complications such as stroke, heart failure, chronic kidney disease and peripheral vascular disease (Kearney et al., 2005; NICE, 2011). These conditions are difficult to manage when they develop and require more resources (WHO, 2013).

Adherence to antihypertensive medications is key in the management of hypertension. A patient is said to be adherent when he/she takes prescribed treatment as stated after a shared decision or consensual agreement about treatment, in which the patient's beliefs and preferences have been considered (WHO, 2003). According to the WHO, only about half of patients will typically adhere to medications (WHO, 2003). For this reason, WHO (2003) called poor adherence rates "a worldwide problem of striking magnitude".

Management of hypertension needs a multidimensional approach involving clinicians, dieticians and psychologists. It is usually an asymptomatic condition needing lifelong treatment hence thorough adherence to medication is very important (Brown & Bussel, 2011).

1.2 Problem Statement

About one in three adults worldwide and one in four adults in Ghana have hypertension (Addo, Amoah, & Koram, 2006; Addo, Smeeth, & Leon, 2008; Cappuccio et al., 2004; WHO, 2013).

It a common chronic non-communicable medical condition seen in the general outpatients' clinic. In a Ministry of Health, Report (2005) hypertension was the second leading cause of out-patient morbidity in adults older than 45 years in Ghana (MOH, 2005). In the out-patient clinic of the Korle Bu Polyclinic, hypertension was the third commonest condition seen in 2011 (KBTH, 2011).

Uncontrolled hypertension has grave consequences. Worldwide, hypertension is responsible for 12.8% of all-cause mortality, 45% of deaths due to heart disease and 51% of deaths due to stroke (Ezzati et al., 2005; WHO, 2013). Studies from Ghana have

also shown the similar cardiovascular effects of hypertension (Addo, Smeeth, & Leon, 2009; Osafo, Mate-Kole, Affram, & Adu, 2011).

Most people who have hypertension are either undiagnosed or uncontrolled (Addo et al., 2012). Uncomplicated hypertension may not present with symptoms, however, when target organ damage develops individuals complain of clinical features like headaches, palpitations, easy fatigability, insomnia, leg swelling among others (NICE, 2011; WHO, 2013).

Despite improvements in the pharmacological management of hypertension, the majority of patients do not have their hypertension adequately controlled (Burnier 2000). The black race is associated with poorer blood pressure control (Fiscella & Holt, 2008). Factors which account for poor blood pressure control include unhealthy lifestyle habits, non-adherence to medical therapy, lack of funds to buy medications and ignorance about the chronic nature of the condition (Bosu, 2010; NICE, 2011; WHO, 2009b).

There are several protocols in the management of hypertension, however, they generally agree on the principles of management which are early detection and treatment to target blood pressure measurements to prevent irreversible, multiple organ damage (James et al., 2013; NICE, 2011; Quinn et al., 2010). Target systolic and diastolic blood pressure should be less than 140mmHg and 90mmHg. However, many patients do not attain this, hence this study was done to assess how hypertensive patients attending the Korle Bu Polyclinic manage their condition.

1.3 Justification

Hypertension, a silent killer, causes on-going damage to the organs of the body, even when the individual appears symptom free (WHO, 2013). Therefore, understanding

how patients manage their condition is an important approach to optimising care in hypertension. This study assessed the blood pressure control of participants and their adherence to antihypertensive medications. The knowledge on adherence and the barriers to care were considered as factors that would provide valuable information on ways to effectively manage hypertension and how counselling for these individuals is done.

1.4 Conceptual Framework

Several factors affect blood pressure control. This includes patients' factors such as adherence, perception of severity and perception of susceptibility to the complications of hypertension. In addition, the presence of co-morbidity and the severity of the disease may also influence blood pressure control. In this study, patients' factors like adherence to antihypertensives, perceived severity, perceived susceptibility to the complications, perceived benefit, perceived barriers and their knowledge and beliefs of hypertension and how they affect blood pressure control are discussed.

This conceptual framework was modelled after the Health belief Model (HBM) which was originally developed by Hochbaum, Rosenstock and Kegels in the 1950s. The HBM was initially used to explain why many people did not take part in public health programs such as TB or cervical cancer screening, but have been used to explain other preventive health behaviours like adherence to medications (Hochbaum, 1958).

The Health Belief Model (HBM) is a psychological model that seeks to explain and predict the health seeking behaviour of individuals by focusing on their attitudes and beliefs. In this study, the core assumption is that patients prescribed antihypertensive medications would adhere to improve blood pressure control. However, this may not be so.

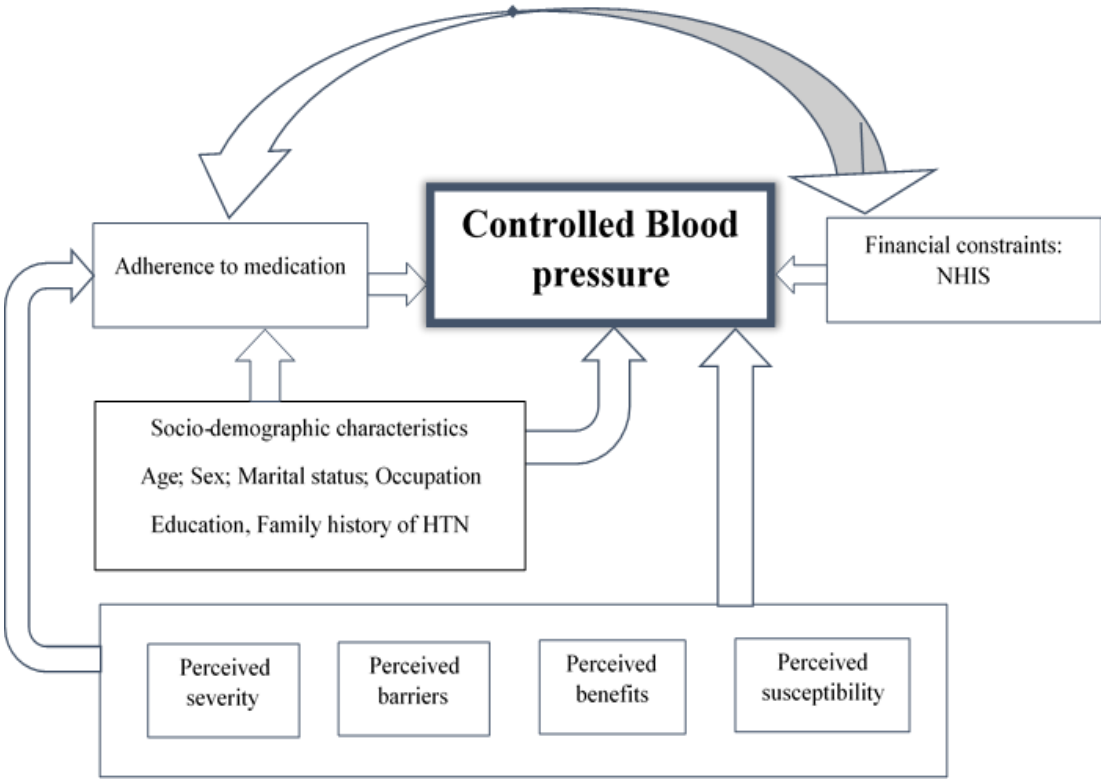

Figure 1.1: Conceptual framework by author based on the Health Belief Model (Rosenstock et al, 1988)

The diagram above shows how socio-demographic characteristics, adherence to medication, valid NHIS, perceived susceptibility, perceived severity, perceived benefits and perceived barriers influence blood pressure control.

The possibility that a person will adopt a preventive behaviour like antihypertensive medication adherence is influenced by their subjective weighing of the costs and benefits of this action. The Health Belief Model concepts include patients' perceived susceptibility, perceived benefits, perceived severity, perceived barriers, cues to action, and self-efficacy towards hypertension (Rosenstock et al, 1988). With the exception of cue to action and self-efficacy, the other constructs will be adopted in this study.

Perceived susceptibility seeks to determine whether an individual consider him/herself at risk of a particular health outcome. For this study, perceived susceptibility was viewed from whether patients considered themselves to be at risk of complications of

hypertension. Lack of perceived susceptibility can lead to risk taking of non-adherence to antihypertensive medications.

Perceived severity refers to the feelings an individual has concerning the seriousness of contracting an illness or of leaving it untreated (including evaluations of both medical/clinical consequences and possible social consequences). For the purpose of this study, perceived severity referred to the feelings patients with hypertension had about the seriousness of their condition which could lead to poor control of hypertension.

Perceived barriers are the potential negative consequences that may result from taking particular health actions, including physical, psychological, and financial demands. In this study, perceived barriers were the factors that impeded or prevented patients with hypertension from adhering to medications.

Perceived benefits are the beliefs an individual has that when he engages in a particular behaviour, it will result in a beneficial effect on him. In this study, perceived benefits are regarded as the belief that taking antihypertensive medications will improve the quality of life, prolong life, prevent complications of the condition and make him feel better.

Other variables like age, gender, marital status, occupation and educational level could have various effects on blood pressure control.

1.5 Objectives

1.5.1 General Objective

To assess how the hypertensive patients attending Korle Bu Polyclinic manage their condition.

1.5.2 Specific Objectives

1 To investigate adherence to antihypertensive medications in hypertensive patients attending Korle Bu Polyclinic.

2 To determine their blood pressure control in these patients.

3 To describe the barriers to effective management of hypertension.

1.6 Research Questions

1 Do patients with hypertension adhere to medications at the Korle Bu Polyclinic?

2 What proportion of patients with hypertension is controlled?

3 What are the barriers to effective management of hypertension?

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed literature in relation to the definition of hypertension, epidemiology of hypertension, risk factors of hypertension, management of hypertension, blood pressure control, adherence to medications, and the health belief model as it relates to hypertension.

The Journals, books, online articles used were obtained from various offline and online sources such as Google Scholar, HINARI, PubMed, Elsevier, Science Direct, Online Wiley library, Oxford Journals, SCOPUS, SAGEPUB, Taylor and Francis and other databases.

2.2 Definitions of Hypertension

Blood pressure has a normal distribution in the population. Though, there is no natural cutoff point above which 'hypertension' definitively exists or below which it does not, complications occur when it is above a certain level (NICE, 2011). Over the last few years, blood pressure level that defines hypertension was lowered from 160/90 mmHg to 140/90 mmHg (Arguedas, Perez, & Wright, 2009; Chobanian et al., 2003). The recommended current blood pressure target reduces the risk of complications that existed in those who were maintained between 140 and 160mmHg systolic blood pressure (Agyemang & Owusu-Dabo, 2008; Grotto, Grossman, Huerta, & Sharabi, 2006).

In an adult, hypertension is defined as sustained elevated blood pressure (BP) greater than 140 mmHg systolic and 90 mmHg diastolic in a non-diabetic, or above 130/80

mmHg in a diabetic, based on the average of at least two or more correctly measured blood pressure readings (Chobanian et al., 2003; NICE, 2011).

Though in clinical practice, the diagnosis is usually made by using two or three blood pressure measurements done one week apart, this excludes individuals with a blood pressure reading of over 220/110 mmHg or when there is a target organ damage (Chobanian et al., 2003; NICE, 2011). However, the National Institute of Clinical Excellence (NICE) and the Canadian Guidelines on Hypertension recommends that individuals with BP of 140/90mmHg or higher be offered Ambulatory Blood Pressure Monitoring (ABPM) to confirm the diagnosis, and for those who cannot do ABPM, home blood pressure monitoring (HBPM) be done (NICE, 2011; Quinn et al., 2010). Both the ABPM and HBPM are difficult to do in low-resourced settings where patients are unable to afford personal sphygmomanometers.

Using the Seventh Joint National Committee on Hypertension (JNC 7), this condition can be classified into prehypertension (120-139/80-89mmHg), stage 1 (140-159/90-99mmHg) and stage 2 (greater than 160/100mmHg) (Chobanian et al., 2003).

2.3 Epidemiology of Hypertension

The “double burden phenomenon” of infectious disease and non-infectious disease continues to rise in Africa (Epping-Jordan, Pruitt, Bengoa, & Wagner, 2004). This period equals the epidemiological health transitions with its attending consequence of poor health care delivery. Concomitantly with this upsurge, around the world, many people with chronic conditions are failing to receive appropriate care. This failure of care is due to lack of both quality and access to healthcare usually experienced by disadvantaged subgroups of the general population (Odeyemi & Nixon, 2013). Consequently, epidemiological transition leads to a health transition where infectious

diseases like diarrhoea and pneumonia are no longer major causes of morbidity and mortality, but non-communicable disease like hypertension, diabetes mellitus, cardiovascular diseases and cancer become the leading causes of morbidity and mortality (Putnam et al., 2011; 2009b). Furthermore, it is postulated that, improvements in medical care and vaccinations, provision of clean water and sanitation result in children living longer, leading to an aging population (WHO, 2009b). These older populations are at higher risk for chronic non-communicable diseases like hypertension. Thus, noncommunicable diseases and their complications accounted for more than two-thirds of all medical admissions and more than 50% of all deaths in a leading teaching hospital in Ghana (MOH, 2005).

Hypertension is a major cause of morbidity and mortality worldwide, especially in the low and middle income economies. It is projected that by 2015, over 29% of the world's adult population will have hypertension, the burden of which is borne by their families and communities.

Many developed countries such as China and Japan have completed this epidemiological transition (Lin, Zhang, Xu, & Xu, 2010), but, Ghana and many other developing countries are undergoing this change. This is evidenced by the increase in the life expectancy at birth for both genders in Ghana (Epping-Jordan et al., 2004). Consequently, with people living longer, there is an increase in the incidence of non-communicable diseases. The heaviest burden of non-communicable diseases are with the poor communities in urban areas (WHO, 2009b).

Europe is considered a high-prevalence hypertension region with countries like Poland (70.7%), Germany (55.3%) and Spain (45.1%) having the highest world prevalence (Kearney et al., 2004). This high prevalence is attributed to excessive nutrient intake,

obesity, physical inactivity, excessive alcohol intake, smoking, environmental toxins, psychosocial stressors, and genetic susceptibility (Wolf-Maier et al., 2003). Germany has a prevalence of 55.3% that is about twice that of the United States of America 28.7% and Canada 22.0% (Prugger, Heuschmann, & Keil, 2006). The age-corrected prevalence for hypertension in South Africa is 21% (Rayner, 2010a). In Nigeria and Cameroon the prevalence of hypertension was reported as 21.1% (Ekwunife, 2010) and 16.9% (Opie & Seedat, 2005) respectively. Other sub-Saharan countries have shown similar prevalence (Addo et al., 2006; Bosu, 2010; Cappuccio et al., 2004).

Approximately, one in every five Ghanaian adult is hypertensive. This prevalence has increased at an alarming rate since the 1960s in Ghana (Bosu, 2010; Cappuccio et al., 2004). In 1968 a prevalence study had put it at 0.5%; however, more recent population-based studies reported a prevalence of between 21% and 35% (Addo et al., 2006; BeLue et al., 2009; Bosu, 2010). In the Ministry of Health Report of 2005, hypertension was stated as the second leading cause of out-patient morbidity in adults older than 45 years in Ghana. In addition, a systematic review done to assess cardiovascular diseases and their nutritional risk in over 100 countries pulling data from published articles, and from national and international agencies concluded that the epidemiological trend associated with diseases of affluence and rapid increase in body mass index has been blamed for this rise in low and middle income countries like Ghana (Ezzati et al., 2005).

The prevalence of prehypertension (a classification of blood pressure by JNC 7 to show individuals who may transit into hypertension in the next five years) is also high and has been documented by several population-based studies (Agyemang & Owusu-Dabo, 2008; Chobanian et al., 2003; de Ramirez et al., 2010; Ganguly, Al-Shafaee, Bhargava, & Duttagupta, 2008; Grotto et al., 2006). In a study done in Israel, they found the

prevalence of prehypertension among 50.6% of men and 35.9% of women young Israeli adults (Grotto et al., 2006). The overall prevalence of prehypertension in a prediabetic Omani population was estimated to be 54.1% (Ganguly et al., 2008). Figures from sub-Saharan Africa has also shown a high prevalence of prehypertension. In a population-based study in three countries; Malawi, Rwanda and Tanzania, researchers found a prevalence of 44% among adults 18 years and older (de Ramirez et al., 2010). Similarly, in Kumasi, Ghana, a population-based study done among adults 18 years and above, found about 40% of their participants were prehypertensive (Agyemang & Owusu-Dabo, 2008).

The prevalence of hypertension varies among age, gender and race (NICE, 2011). The black race is a risk factor for the development of hypertension (Opie & Seedat, 2005). In a study done in America, race/ethnicity was a single independent predictor of hypertension, with non-Hispanic Blacks more likely to be hypertensive as compared with Hispanics [OR 2.38, 99% (CI), 2.17–2.61] and non-Hispanic Whites [OR, 1.64, 99% CI, 1.52–1.77] (Holmes, Hossain, Ward, & Opara, 2013).

A study in the middle-age French population, found the prevalence of hypertension to be greater among men (47%) than in women (35%) (Wagner et al., 2011). Another study in Brazil showed the prevalence of hypertension to be between 15 and 20% in those 20 years and older, but about 50% in the elderly (Costa Rdos & Nogueira, 2008).

In Ghana, a population-based study of the Ashanti region, found a prevalence in those below 40 years was about 6%, 35% of those between 40 and 45 years and 40% in those older than 55 years of age (Cappuccio et al., 2004). Hospital-based reports also corroborate the high morbidity pattern. In 2009, hypertension was the fourth most common cause of out-patient attendance at the Korle Bu Polyclinic (KBTH, 2009). In

2010, cerebrovascular accidents and other complications of hypertension were the fourth and sixth causes of admission respectively (KBTH, 2010).

Hypertension and its attending complications are of immense public health concern because they pose an enormous burden on the individual, the family and the economy at large. Uncontrolled hypertension leads to damage of a number of organs. A Ghanaian study done among civil servants, found that the prevalence of target organ damage such as stroke was 2.8%, left ventricular hypertrophy was 33.3%, chronic kidney failure was 4.1% and hypertensive retinopathy was 70.2% (Addo, Smeeth, & Leon, 2007). Another study in Accra done in four primary care centres found a high prevalence of chronic renal disease (46.9%) among hypertensive patients attending those facilities (Osafo et al., 2011).

2.4 Risk factors for Hypertension

Several factors account for the rise in the prevalence of hypertension; the shift in lifestyle toward sedentary and change of our local diet account for the bulk increase (Addo et al., 2006). One way of controlling this epidemic in Africa is to decrease salt intake (BeLue et al., 2009; Chobanian et al., 2003; Opie & Seedat, 2005). It is necessary to educate the general population about the amount of salt in locally salt-preserved foods like fish or meats eaten in the sub-region. An increase in morbidity associated with hypertension does not only reflect a high prevalence of hypertension, but it is also an indication of inadequate rates of detection, treatment and control (Addo et al., 2012).

Systematic reviews done to assess cardiovascular diseases and their nutritional risk in over 100 countries pulling data from published articles, and from national and international agencies concluded that increase in life expectancy, physical inactivity, increased salt or fat intake and increase in body mass index are reasons why low and

middle income countries like Ghana continue to bear the brunt of non-communicable diseases like hypertension (Ezzati et al., 2005; WHO, 2013).

Low socioeconomic class has also been associated with hypertension because of increased socioeconomic stressors, lack of accessibility to health facility, and poor dietary intake. Similarly, higher economic class may predispose to hypertension because of dietary excesses, excess alcohol consumption, lack of exercise and obesity (BeLue et al., 2009).

Identification of major risk factors, their prevention and control form the basis of the prevention of non-communicable diseases like hypertension. Hypertension may be primary or secondary. Most patients do not have any identified aetiology and are classified as having essential hypertension while in secondary hypertension a cause can be found (Viera & Neutze, 2010). Secondary hypertension occurs in about 5 to 10% of adults and about 85% of children with hypertension. In adults, renal artery stenosis, thyroid disorders, phaeochromocytoma, obstructive sleep apnoea and Cushing's syndrome are the most common aetiologies implicated in secondary hypertension. Secondary hypertension is amenable to treatment and it is usually not managed definitively at the primary care level (Viera & Neutze, 2010).

Essential hypertension has several risk factors; modifiable and non-modifiable risk factors. The non-modifiable risk factors for hypertension are the male gender, black race, increasing age and familial predisposition. The modifiable risk factors are obesity, dyslipidaemia, physical inactivity, excessive alcohol intake and smoking. Obesity is an independent risk factor for hypertension, diabetes mellitus and dyslipidaemia (Prugger et al., 2006). All these conditions are also independent risk factors for cardiovascular diseases.

2.5 Lifestyle Modification and Hypertension

Studies have shown that lifestyle modification either as an adjuvant to drug therapy or alone in the treatment of hypertension increases the chances of achieving blood pressure control (Chobanian et al., 2003; Hackam et al., 2010; 2011; Ohta, Tsuchihashi, & Kiyohara, 2011). However, many patients are not being educated on the benefits of lifestyle modification as shown by a study done in five countries (Australia, Canada, New Zealand, United Kingdom, and United States of America). Their sample included people who rated their health as fair or poor; who reported recent serious illness, injury, or disability; or who had recently undergone major surgery or been hospitalised for illness. This study reported that only about a third of the participants had been educated on the benefits of lifestyle modification over a two year period (Blendon, Schoen, DesRoches, Osborn, & Zapert, 2003).

Lifestyle modification in chronic disease management like hypertension involves dietary approach to stop hypertension (DASH) diet, increased physical activity, moderation in alcohol consumption and cessation of smoking.

The DASH diet is a palatable dietary pattern that lowers blood pressure and it is acceptable to the general population (Champagne, 2006). It is a diet rich in vegetables, fruits and fibre. It also contains low sodium and monounsaturated fats, but high in polyunsaturated fats (Champagne, 2006). The DASH diet decreases systolic blood pressure by 8-14mmHg while salt reduction decreases systolic blood pressure by 2-8mmHg.

Aerobic exercise reduces systolic blood pressure in both normal subjects and hypertensive patients. It is an important component of lifestyle modification for prevention and treatment of hypertension (Whelton, Chin, Xin, & He, 2002). It

decreases blood pressure through a reduction of vascular resistance and favorably affects cardiovascular risk factors like obesity and dyslipidaemia (Cornelissen & Fagard, 2005). Increased physical activity reduces systolic blood pressure by 4-9mmHg and a 10kg body weight loss reduces systolic blood pressure by 5-20mmHg (Chobanian et al., 2003).

Other components of lifestyle modification are reduction in alcohol intake and cessation of smoking. Alcohol consumption at 2.5–14.9 g/day (about ≤1 drink a day) is associated with a 14–25% reduction in cardiovascular risk compared with abstaining from alcohol (Ronksley, Brien, Turner, Mukamal, & Ghali, 2011). However, consumption of large amounts of alcohol is associated with higher risks for stroke (Ronksley et al., 2011). Moderate alcohol drinking reduces blood pressure by 2-4mmHg (Chobanian et al., 2003).

2.6 Blood Pressure Control

Before 2003, blood pressure control was defined as a systolic blood pressure or diastolic blood pressure of less than 160/90mmHg. However, blood pressure is controlled if systolic blood pressure is less than 140mmHg and diastolic blood pressure is less than 90mmHg (James et al., 2013).

Some articles have proposed different level of control for diabetics. A randomized controlled trial (ACCORD study) done among diabetics followed up for a year found no added benefit in reducing the systolic blood pressure to less than 120mmHg (Cushma et al., 2010). Also, the recently released JNC 8 now recommends that a target blood pressure for diabetic hypertensive patients should be less than 140/90mmHg just like those without diabetes. This was supported by a systematic review carried out by a panel of hypertension experts who reviewed several randomized controlled trials on

hypertension concluding that there was no added cardiovascular benefit of reducing their target blood pressure as earlier stipulated (James et al., 2013).

Worldwide, awareness of hypertension is poor and adequate control rate in those on treatment is also low. In 2010, of the sixty-six million Americans who had hypertension, only 63% were aware of it, 45% of them were on treatment and only 45% of those on treatment were controlled (Sutters, 2013).

A French middle-age population based study (MONA LISA) was done to determine the prevalence of hypertension, awareness, treatment and control. The control rate obtained was 38% and 22% in middle-aged women and men, respectively and it decreased with age (Wagner et al., 2011). In Canada a blood pressure control rate of 54.4% was found among diabetics, (Putnam et al., 2011) while in Germany, treatment and control rates were 28% and 8% respectively (Prugger et al., 2006).

The black race is associated with poorer blood pressure control (Fiscella & Holt, 2008). Various population-based studies in sub-Saharan Africa have shown various figures on treatment and control of hypertension. In a community-based study done in Edo State, Nigeria, only 18.5% of hypertensive patients were aware of the condition. Of these, 77.3% were on treatment, but only 25.4% were controlled (Omuemu, Okojie, & Omuemu, 2007). Another study in South Eastern Nigeria, found that only 30% of persons with hypertension had prior knowledge and 9% of those aware of the condition had controlled hypertension (Ekwunife, 2010). In Ghana, a study found in the Ashanti region that 22% of their participants knew they were hypertensive. Of these, 11.3% were on treatment, but only 2.8% were controlled (Cappuccio et al., 2004).

Similarly, a hospital-based study done in the General Out-Patients' Department of Lagos State University Teaching Hospital, Nigeria found that only 21.21% of their

subjects had blood pressure control. This low control rate was attributed to low incomes (Awobusuyi, Adebola, & Ajose, 2012).

To reduce the grave cardiovascular effects of hypertension, better blood pressure control is needed (Addo et al., 2008; Chobanian et al., 2003; Ekwunife, 2010; Mbada, Adedoyin, & Odejide, 2010; 2011). About 40% of patients with chronic conditions do not receive adequate health care in the United States of America (Sutters, 2013). Inadequate funds, inexperience, and lack of infrastructure remain important barriers to hypertension diagnosis and therapy (Addo et al., 2008). Developing countries often struggle with the complexity of insufficient resources combined with inadequate access to necessary medications leading to poor control rate (Opie & Seedat, 2005).

Some of the factors responsible for inadequate blood pressure control include improper blood pressure measurement, excess salt intake, inadequate diuretic therapy, excess alcohol intake, inadequate doses of medications, drug-drug interaction (NSAID, illicit medications, OCP) which may induce or exacerbate hypertension (Chobanian et al., 2003; NICE, 2011). The presence of other conditions like renal disease, thyroid disease, Cushing's disease, and pituitary tumours are factors that can lead to poor blood pressure control (Sutters, 2013).

Cardiovascular risks associated with uncontrolled hypertension are progressive. Even when individuals with hypertension do not have symptoms and signs, target organ damage is on-going (WHO, 2013). A three-month delay in treatment of high-risk patients with hypertension results in a twofold increase in cardiovascular morbidity and mortality (Chobanian et al., 2003). Also for every 2% rise in systolic blood pressure there is a 7% increased risk of mortality from ischemic heart disease and 10% risk of developing a fatal stroke (NICE, 2011).

2.7 Management of Hypertension

The use of automated Sphygmomanometers is an accepted way to measure valid blood pressure measurement in primary care because it does not provoke white coat response which is often seen with manual blood pressure measurement (Myers et al., 2011). In addition, manual blood pressure devices are associated with user-bias which is attributed to terminal digit preference, wrong Korotkoff interpretation, threshold avoidance, and incorrect deflation speeds (Hezelgrave & Shennan, 2012). It also increases the number of measurements that can be done (Pickering et al., 2005).

Clinic measurements should be used to monitor blood pressure control during treatment except in those with white coat effect where ABPM or HBPM can be used (NICE, 2011). The target clinic blood pressure in those less than 80 years is 140/90 mmHg but 150/90 mmHg for people older than 80 years of age. When using ABPM or HBPM these values are 135/85 mmHg and 145/85 mmHg, respectively (NICE, 2011).

There is an increased risk of cardiovascular diseases in those with prehypertension with about 50% of them developing hypertension within four years. Therefore, annual monitoring and instituting lifestyle modification is advocated (Sutters, 2013). The long-term benefits of targeting individuals with prehypertension with lifestyle modifications may be of greater benefit for low or middle income countries like Ghana, where activities aimed at controlling clinical hypertension have to compete with many other pressing health needs (Agyemang & Owusu-Dabo, 2008).

After diagnosis, all patients should be counselled on lifestyle modification. Antihypertensive medication therapy is initiated in people with sustained systolic blood pressure of 160 mmHg and above or sustained diastolic blood pressure of 100 mmHg and above. In those with sustained systolic blood pressure between 140 and 159 mmHg

and/or sustained diastolic blood pressure between 90 and 99 mmHg, the decision to start drug treatment is dependent on the presence or absence of cardiovascular disease, target organ damage, or an estimated increased cardiovascular disease risk (Williams et al., 2004).

2.8 Adherence to Treatment and its Measurements

Adherence is defined as a shared decision or consensual agreement about treatment, in which the patient's beliefs and preferences have been considered (WHO, 2003). It also signifies the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (Rand, 1993).

Adherence must be combined with medication persistence to be able to achieve adequate control. Medication persistency is the consistent and timely medication-taking behaviour over time, particularly with regard to chronic drug therapy like hypertension (WHO, 2003). Non-adherence with reduced persistence in taking antihypertensive medications results in poor blood pressure control, worse clinical outcomes, and higher health care costs (Hill, Miller, & DeGeest, 2010).

Causes of non-adherence generally fall into two broad groups: intentional and unintentional. Approximately 31% of patients reported unintentional non-adherence and 9% reported intentional non-adherence (Lowry, Dudley, Oddone, & Bosworth, 2005).

Unintentional non-adherence occurs when the patients are willing to follow the agreed treatment, but they are prevented from doing so by barriers that are beyond their control. Typical instances include poor recall or difficulties in understanding the instructions, problems with using the treatment, inability to pay for the treatment, or simply

forgetting to take it (Lowry et al., 2005). With the impact of the National Health Insurance Scheme (NHIS) and the adoption of patient oriented strategies, cost of medications should no longer be a significant reason for non-adherence in Ghana. NHIS was established in Ghana about a decade ago and 45% of the general population has registered with the scheme. A five year review of its implementation showed the protective health benefits of this scheme in the lower earning populations (Nguyen, Rajkotia, & Wang, 2011). This includes, reducing the of out-of-pocket payment burden for health services by covering the payment for outpatient consultation, associated medications, laboratory tests, in-patient care, treatment of cervical and breast cancers, basic oral health services, eye care, maternal care, and all emergency conditions (Nguyen et al., 2011; Odeyemi & Nixon, 2013).

Intentional non-adherence occurs when the patient decides not to follow the treatment recommendations (Lowry et al., 2005). The health belief model (HBM) has received a lot of research attention and has been applied to a broader range of health behaviors, including medication adherence than any other social cognitive models (Cameron, 1996).

The importance of treatment adherence cannot be overemphasized as non-adherence waste resources and worsen health outcomes (Hill et al., 2010; McHorney, 2009). However, there is no gold standard method for measuring medication adherence (WHO, 2003). A number of direct and indirect methods have been used to measure medication adherence with each method having advantages and disadvantages (Osterberg & Blaschke, 2005).

Direct methods like measuring of the drug or its metabolite in a biological fluid, such as blood or urine only show that the patient took the last dose of medication but provides

no information on how regular the medications are being taken and expensive. Another direct method of measuring drug adherence is observation of the patient receiving the medication which is reliable but time consuming and impracticable since the observer may not be able to observe the patients all day long, especially for those on long term treatment or patients may hide pills in their mouth and discard them later (Osterberg & Blaschke, 2005).

Indirect methods include self-reporting by the patient, medication measurement or pill count, use of electronic monitoring devices, and prescription record review (Osterberg & Blaschke, 2005). Recall bias, attempts to please the health care provider, or a combination of both factors are disadvantages of using self-reporting adherence scales (Haynes, McDonald, & Garg, 2002).

A systematic review done to assess five adherence scales evaluated criteria for selecting them like short length, internal consistency, reliability, barriers to adherence, literacy appropriate, and self-efficacy, sensitivity, specificity, and diseases in which they have been validated concluded that different adherence scales had their advantages and limitations (Lavsa, Holzworth, & Ansani, 2011). These scales were the Medication Adherence Questionnaire (MAQ) which was the shortest scale and easiest to score but it did not measure self-efficacy though it measured barriers to non-adherence. Both Self-efficacy for Appropriate Medication Use Scale (SEAMS) and the Brief Medication Questionnaire (BMQ) assessed barriers and self-efficacy but they had a difficult scoring system. The Hill-Bone Compliance Scale and Medication Adherence Rating Scale (MARS) evaluated barriers and self-efficacy but were limited in their generalizability. The Hill-Bone Compliance Scale focuses on hypertensive patients, while MARS is specific to psychiatric populations (Lavsa et al., 2011).

The Morisky's Medication Adherence Scale (MMAS) is the most widely used self-reporting adherence scale. The initial MMAS was a validated 4-item self-reported adherence measure that has been shown to be predictive of adherence to cardiovascular medications and blood pressure control (Ho, Bryson, & Rumsfeld, 2009). It consisted of four questions on forgetting medication, carelessness and stopping medication when feeling better or worse, with affirmative answers scoring 0 and negative responses scoring 1. This scale gave an idea to which extent each patient is adherent and it did not address the circumstances surrounding adherence behaviour which was added in the 8-item MMAS.

The eight-item scale has a higher sensitivity of 93% (Cronbach alpha 0.83) than the original 4-item scale (Cronbach alpha 0.61) which indicates that the scale has a higher ability to detect patients who are low medication adherers and have uncontrolled hypertension (Morisky, Ang, Krousel-Wood, & Ward, 2008). This scale includes 7 items with yes/no response options and 1 item with a 5-point Likert scale response option. Based on this overall score, patients can be classified as having poor, medium, or high adherence (Morisky score <6, 6–7, and 8, respectively) (Morisky et al., 2008). The items in the scale provide information regarding barriers to medication adherence such as forgetting to take medications, not taking medications when one feels worse, and difficulties in sticking to a treatment plan (Morisky et al., 2008).

Those patients who are high adherers and have controlled hypertension should be commended while reinforcing the profits such good adherence behaviour. For others, who are not controlled but have good adherence behaviour, more stringent pharmacological therapy is required to improve blood pressure control (Moser & Setaro, 2006). However, patients who are low adherers and have uncontrolled

hypertension, should have repeated in-depth education and counselling. Significant others such as family members for support can be engaged. Measurement of adherence remains only an approximation of a patient's actual behaviour (WHO, 2003).

2.9 Factors Affecting Adherence

Non-adherence to medications is a common cause of poor blood pressure control (Bennett et al., 2009). An adherence rate to antihypertensives of 37% was found among hypertensive patients attending a renal clinic in Kumasi, Ghana; 34% of these patients said forgetfulness was their reason for non-adherence; another 31% said it was due to cost (Harries, Twumasi-Abosi, Plange-Rhule, & Cappuccio, 2005). In Kano, Nigeria, another hospital-based study in hypertensive patients found a non-adherence rate of 45.8%. Ignorance and lack of funds were the major reasons for non-adherence and each of them accounting for 32.7%, while forgetfulness accounted for only 3.0% (Kabir, Iliyasu, Abubakar, & Jibril, 2005).

Non-adherence is a multi-factorial health behaviour. WHO (2003) highlighted the five dimensions of adherence as social and economic, health care system, condition related, therapy related, patient related.

Poor physician communication skills can result in poor adherence. A meta-analysis concluded that when physicians are proficient in communication skills, it leads to about 60% significant rise in patient adherence than when a physician receives no training (Zolnierek & Dimatteo, 2009). Another contributing factor is poor adherence to guidelines by providers. An inadequate antihypertensive regimen was implicated as the most probable reason for uncontrolled BP in a majority of patients, which accounted for 72% (Rose, Berlowitz, Orner, & Kressin, 2007).

The patient related factors can be classified into physical and psychological components. Physical factors include disabilities like visual impairment, hearing impairment, cognitive impairment, impaired mobility or dexterity and swallowing difficulties (WHO, 2003). This leads to unintentional non-adherence. On the other hand, psychological or behavioural factors include knowledge about disease, perceived risk/susceptibility to disease, understanding reason medication is needed, expectations or attitudes toward treatment, perceived benefit of treatment, self-efficacy, motivation, fear of possible adverse effects, fear of dependence, feeling stigmatized by the disease, frustration with health care providers psychosocial stress, anxiety, anger, alcohol or substance abuse (Ungari & Dal-Fabbro, 2010).

Patients related factors and behaviours can be explained using the Health Belief Model (HBM). This model makes assumptions that individuals develop beliefs that influence the interpretation of information and experiences that guide behaviour. The HBM has been used to predict the variability that characterizes behavioural adherence (Rosenstock, 2005). Four of the six HBM constructs will be used in this study; namely perceived susceptibility, perceived seriousness, perceived benefits of taking action and barriers to taking action (Rosenstock, 2005).

HBM suggests that patients reflect on a health-related behaviour (e.g. adherence) by considering their perceived susceptibility to an illness and the seriousness of the illness, as well as the benefits of the action (Ross, Walker, & Macleod, 2004).

Patients do not always take their medication exactly as prescribed and healthcare professionals are often unaware of it. The purpose of assessing adherence is not to monitor patients, but rather to find out whether patients need more information and support. This support may take the form of further information and discussion, or

involve practical changes to the type of medicine or the regimen. Any intervention to support adherence should be considered on a case-by-case basis and should address the concerns and needs of individual patients (NICE, 2011). Hence, this study assessed how patients with hypertension managed their condition in Korle Bu Polyclinic.

CHAPTER THREE

METHODOLOGY

Type of study, study area, variables, study population, sampling, data collection, quality control, data processing and analysis, ethical considerations and pre-test are discussed in this section.

3.1 Study Design

This study was a descriptive cross-sectional survey of adult hypertensive patients who attended Korle Bu Polyclinic.

3.2 Study Setting

The study was conducted at the Korle Bu Polyclinic department, the primary health care centre of Korle Bu Teaching Hospital. The Korle Bu Teaching Hospital is the premier national tertiary referral health facility in Ghana and it is situated in Ablekuma Sub Metropolitan area of Accra. The Ablekuma Sub Metropolitan area has a population of about 763,853 (Sub-Metro, 2009). The centre primarily serves the local population, however, it attends to a wide range of patients coming from the Accra metropolis and beyond.

The Korle Bu Polyclinic provides twenty-four hour service, with a 42-bed capacity recovery and admission ward facility and an out-patient daily attendance of about 200. It attends to about 40 hypertension-related cases per day. Other services provided include ophthalmic screening and treatment of minor ophthalmic conditions, laboratory services, X-ray, twenty-four hour pharmacy service, under five immunizations and home visits (KBTH, 2011). It has a staff strength of 26 doctors, 67 nurses, 15 pharmacists and other non-health staff.

The Korle Bu Polyclinic is an accredited centre for residency training in Family Medicine for both West African College of Physicians and Ghana College of Physicians and Surgeons.

3.3 Variables

The dependent variable was controlled blood pressure while age, gender, marital status, occupation, monthly income, valid NHIS, educational status, adherence to medication, perceived susceptibility, perceived severity, perceived benefits and perceived barriers were independent variables. These independent variables either directly or indirectly affect blood pressure control.

3.4 Study population

Adult hypertensive patients who attended the Korle Bu Polyclinic on out-patient basis were used for the study. They were recruited based on the following criteria;

3.4.1 Inclusion Criteria

Consenting hypertensive patients above 18 years of age and who had been diagnosed for at least six months.

3.4.2 Exclusion Criteria

1. Pregnant hypertensive patients.
2. Female patients on oral contraceptive pills or on hormone replacement.
3. Patients with symptomatic psychiatric illness.
4. Acutely ill hypertensive patients requiring admission.
5. Refusal to give consent.

3.5 Sampling

3.5.1 Sample Size

The sample size was calculated using the formula: $n = \frac{z^2pq}{d^2}$

(The reference population is > 10,000): (Araoye, 2004).

Where Z = 1.96 normal deviate representing the 95% confidence limit

d = 0.05 as the acceptable margin of error

p = the probability of the event occurring, in this case the prevalence of controlled hypertension in Ghana is approximately 13% (0.13) as gotten from a systematic review (Addo et al., 2012).

q = 1 - p = which is the probability of the event not occurring, in this case: 1 – 0.13 = 0.87

The sample size was determined as follows:

$$n = \frac{1.96^2(pq)}{d^2}$$

$$n = \frac{1.96^2(0.13)(0.87)}{0.0025}$$

$$= \frac{0.4345}{0.0025}$$

Minimum sample size required is = 173.8

A non-response rate of 10% was compensated for by computing 10/100 x 173.8 = 17.4, which was added to the minimum sample size to give a total of 191. A sample size of 191 patients will be recruited for the study.

3.5.2 Sampling Method

Patients were recruited using a systematic random sampling method at the outpatient clinic of Korle Bu Polyclinic and based on the selection criteria. Recruitment took place during the hours of 9am to 5pm on weekdays. During this period, it was estimated that an average of 40 patients with hypertension present to the facility each working day. Sample frame was acquired from multiplying 40x5x4=800. (Where 5 is the number of weekdays, and 4weeks is the study duration).

Eight hundred (800) patients with hypertension attended the outpatients' department of Korle Bu polyclinic during the study period. The sampling interval was 800/191 = 4.2. A sampling interval of 4 was used. The first patient was selected by ballot from the first four hypertensive patients each morning and every subsequent fourth patient thereafter until the daily required sample size is attained. Face to face interviews were done using the semi-structured questionnaires and responses were recorded on the questionnaires.

3.6 Data Collection

A pre-tested semi-structured questionnaire and the Morisky's Medication Adherence Scale (MMAS) were used in this study. The semi-structured questionnaire consists of closed and open-ended questions that assessed socio-demographic characteristics, history of hypertension in the participants, blood pressure and anthropometric measurements.

3.7 Data Collection Tools

Blood pressure measurements were performed by the research assistants and the author using two Omron i-C10 digital automatic blood pressure monitors. These two automated monitors were validated against the mercury sphygmomanometers to ensure that the difference between the measured (automated monitors) and the observed

(mercury sphygmomanometers) blood pressure were between 0–5mmHg. This represents measurements considered to be very accurate with no error of clinical relevance. Also, the sphygmomanometer batteries were changed daily to ensure they function optimally.

Participants were asked if they had smoked or drank caffeine thirty minutes before the blood pressure readings were taken. In such patients, blood pressure reading was delayed for thirty minutes. They were required to sit quietly, back supported, feet on the floor with loosened clothing around the arm for at least five minutes before the blood pressure readings were taken. With the arm adequately exposed and at the level of the heart, the appropriate cuff (bladder width being 80% of the arm circumference) was applied securely. Three readings were taken one minute apart. The first was discarded, and the mean of the other two readings was determined.

Waist circumference was measured at the minimum circumference midway between the iliac crest and the rib cage using a measuring tape in centimeters while the participants were standing.

The patients' height was measured to the nearest 0.5cm on a flat platform without their shoes using a height rule. Weight was measured with a manual Seca 761 scale to the nearest 0.5kg. Body mass index (BMI) was calculated using the formula; BMI (kg/m^2) = weight (kg) /$height^2$ (m^2).

How patients manage hypertension was assessed by how adherent to antihypertensive medications the participants were, their belief of hypertension and their perceived susceptibility, perceived severity, perceived benefits and perceived barriers. Morisky Medication Adherence Scale (MMAS-8) was used to assess antihypertensive medication adherence while their perceived barriers to treatment was assessed using

structured questions in the questionnaire (see appendix 2, section 8:0; questions 24 to 36 for perceptions of hypertension and section 9:0; questions 37 to 44 for medication adherence).

This scale is a self-reporting, medication-taking behaviour scale that has been validated for hypertension. It has a good reliability with a Cronbach alpha of 0.83 (Morisky et al., 2008). The latest version of the scale (MMAS-8) was used in the study and it consists of eight items with a scoring scheme of "Yes" = 0 and "No" = 1 for the first seven items and a 5-point Likert response to the last item. The items are summed to give a range of scores. A score <6 signifies low adherence, 6-7 moderate adherence and >8 high adherence.

3.8 Quality Control

To ensure reliability of the data, research assistants were trained to adequately administer questionnaires and take blood pressure, height, weight and waist circumference measurements. Questionnaires were critically examined at the end of each day. Data handled by the research assistants were cross checked for consistency and completeness by verifying from the source records. Research assistants also double checked data gathered by the principal investigator all with the aim of achieving accuracy. Double entry of the raw data was done using Excel spreadsheet by the principal investigator and a colleague to maintain accuracy and consistency.

3.9 Data Processing and Analysis

Questionnaires were coded and manually entered into an excel spreadsheet. It was then imported into STATA (SE) 13 and analysed.

Descriptive statistics were tabulated while mean and standard deviation were computed for continuous variables. Chi square test was used to evaluate associations between

categorical variables. Fisher's exact test was used to test for association for categorical variables when a cell contained less than 5.

Age was summarized using mean with accompanying standard deviations, and comparison between genders done using t-tests. It was then modelled as a categorical variable defined as 30 to 45 years, 46 to 60 years, 61 to 75 years, >75 years.

Waist circumference was categorised into normal ($\leq$88cm for females and $\leq$104cm for males) and abdominal obesity (>88cm for females and >104cm for males). Body mass index (BMI) of <24.9kg/m^2 was normal and > 25kg/m^2 was overweight/obese.

The defined outcome of interest was controlled blood pressure (dependent variable) defined as the mean blood pressure reading of between 90-139.9mmHg systolic and 60-89.9mmHg diastolic respectively.

The exposure of interest was levelled adherence to antihypertensive medications (independent variable) developed from an index using predetermined set of questions which measured "Yes" as "0" and "No" as "1" for questions 1-7 while 8 was measured on a Likert scale of 0 to 4; 0 never/rarely to 4 being all the time. The minimum and maximum mean scores achievable for the Morisky Medication Adherence Scale are 1 and 8 respectively. A participant is said to have low adherence if mean scores were <6, moderate adherence 6-7 and high adherence when they score 8.

The prevalence of controlled blood pressure among study participants was defined as the total number of participants with controlled blood pressure divided by the total number of participants.

Logistic regression was used to estimate the effect of adherence on the odds of controlled blood pressure adjusting for potential confounders. Gender, age, marital

status, educational level was considered a priori as confounders. The likelihood ratio test was used to estimate the p-values for the effect of categorical variables on the outcome. Crude and adjusted odd's ratios (OR) were obtained with 95% confidence intervals (95% CI). All reported p-values were two-tailed and considered statistically significant at a level of $p < 0.05$.

The defined outcome of interest was controlled blood pressure (dependent variable) defined as the mean blood pressure reading of between 90-139mmHg systolic and 60-89mmHg diastolic respectively.

3.10: Ethical Consideration

Ethical clearance was obtained from the Ghana Health Service Ethical Review Board. Permission was also sought from the facility and a written informed consent was obtained from all participants prior to enrolling them into the study and confidentiality were maintained at all levels of the study.

As the participants arrived at the facility, all potential participants were approached and informed that participation in the study was completely voluntary, refusal to participate would have no consequences and they could refuse to part-take in the study at any time. The quality of care they assessed would not be affected in any way should they refuse to take part in this study. Those who agreed to take part had their information entered in a quiet consulting room to ensure privacy. They were informed that all the information provided were confidential. It was entered into a laptop with a secured password from where data was analysed.

3.11 Pretesting

The questionnaire was pre-tested on 10 hypertensive patients who were excluded from the final study. The easy to administer and the ambiguity of the questions were assessed and the average duration of questionnaire administration was determined after the pretesting. Appropriate modifications were made to the questionnaire. Before pretesting commenced, research assistants were trained to adequately administer questionnaires and take blood pressure, height, weight, and waist circumference measurements. Research assistants also double checked data gathered by the principal investigator with the aim of achieving accuracy.

3.12 Conflict of interest

Apart from the academic and public health importance of the study, I have no other personal interest in the study.

3.13 Funding information

This research was financed by me.

3.14 Dissemination of Results

The groups listed below are the targets for the dissemination of the results.

1. School of Public Health, University of Legon
2. Healthcare practitioners involved in hypertension care at the Korle Bu polyclinic
3. Patients with hypertension who attend Korle Bu polyclinic
4. A scientific paper will be written for Ghana Medical Journal for publication.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the findings of the study. These findings have been organised into sections on the background characteristics of study participants, level of adherence to antihypertensive medications, blood pressure control of study participants and describing the beliefs and barriers to effective management of hypertension.

4.1 Background Characteristics of Participants

Table 4.1 describes the socio-demographic characteristics of the participants. There were 195 participants studied with 46 (23.59%) males and 149 (76.41%) females. This gave a male to female ratio of about 1:3. The mean age of the participants was 60.98±12.99 years with the ages spanning 30 to 106 years. The males in this study had a lower mean age (59.52± years) than for the females (61.43± years).

Little over half 100 (51.28%) of the participants were married, 66 (33.85%) were widows/widowers, 21 (10.77%) were divorced, 6 (3.08%) were never married.

A large number of the participants 71 (36.41%) had no formal education, 33 (16.92%) had primary education while 48 (24.62%) had up to JSS/middle school education. Only 30 (15.38%) had secondary education while 13 (6.67%) had tertiary education.

More than half of the participants 105 (53.85%) were employed while the rest were either unemployed 79 (40.95%) or retired 11 (5.64). More than half 116 (59.49%) participants had a monthly income. A good number of these 73 (62.93) earned GH₵ 100-500 (< $110 as at time of study). Majority 178 (91.28%) of the participants had valid NHIS.

Table 4. 1: Socio-demographic characteristics of participants

Variables	Number of participants, N = 195 (100%)			χ^2	p-value
	Male 46 (23.59)	**Female 149 (76.41)**	**Total 195 (100)**		
Age (years)				4.173	0.243
30-45	10 (21.74)	19 (12.75)	29 (14.87)		
46-60	12 (26.09)	54 (36.24)	66 (33.85)		
61-75	20 (43.48)	55 (36.91)	75 (38.46)		
>75	4 (8.70)	21 (14.09)	25 (12.82)		
Religion				1.169	0.760
Christian	37 (80.43)	118 (79.19)	155 (79.49)		
Muslim	8 (17.39)	29 (19.46)	37 (18.97)		
Traditional	1 (2.17)	2 (1.34)	3 (1.54)		
Marital Status				41.053	*<0.001
Never married	0 (0.00)	6 (4.03)	6 (3.08)		
Married	40 (86.96)	60 (40.27)	100 (51.28)		
Divorced	2 (4.35)	19 (12.75)	21 (10.77)		
Separated	1 (2.17)	0 (0.00)	1 (0.51)		
Co-habiting	1 (2.17)	0 (0.00)	1 (0.51)		
Widow/widower	2 (4.35)	64 (42.95)	66 (33.85)		
Educational status				39.417	*<0.001
No formal education	5 (7.04)	66 (44.30)	71 (36.41)		
Primary	5 (10.87)	28 (18.79)	33 (16.92)		
JHS/middle School	13 (28.26)	35 (23.49)	48 (24.62)		
Secondary	13 (28.26)	17 (11.41)	30 (15.38)		
Tertiary	10 (21.74	3 (2.01)	13 (6.67)		
Occupational status				2.1871	0.335
Unemployed	15 (32.61)	64 (42.95)	79 (40.51)		
Employed	27 (58.70)	78 (52.35)	105 (53.85)		
Retired/pensioner	4 (8.70)	7 (4.70)	11 (5.64)		
****Monthly Income (GH₵)**				7.4440	0.059
<100	2 (6.45)	6 (7.06)	8 (6.69)		
100-500	15 (48.39)	58 (68.24)	73 (62.93)		
>500-1000	8 (25.81)	17 (20.00)	25 (21.55)		
>1000	6 (19.35)	4 (4.71)	10 (8.62)		
Total	31 (26.72)	85 (73.28)	116(100)		
Valid NHIS				0.3502	0.554
Yes	41 (89.13)	137 (91.95)	178 (91.28)		
No	5 (10.87)	12 (8.05)	17 (17)		
Total	46 (23.59)	149 (76.41)	195 (100)		

***p<0.05 shows statistical significance, **Not all respondents had an income**

4.1.2 Hypertension History

Table 4.2 shows an overview of the history of hypertension. The median duration of hypertension was 4 years with an interquartile range of 2 to 10 years. There was a positive family history of hypertension in 145 (74.36%) participants. Most of the participants 186 (95.38%) reported that they took their antihypertensive medications every day. More than half 101 (51.79%) of the participants did not have any other chronic medical condition.

Table 4. 2: Hypertension History

Variables	Number of Participants, N = 195 (100%)			χ^2	p-value
	Male 46 (23.59)	Female 149 (76.41)	Total 195 (100)		
Family history of hypertension				3.6375	0.056
Yes	29 (63.04)	116 (77.85)	145 (74.36)		
No	17 (36.96)	33 (22.15)	50 (25.64)		
Duration of hypertension (years)				0.2904	0.865
1-10	36 (78.26)	116 (77.85)	152 (77.95)		
11-20	7 (15.22)	20 (13.42)	27 (13.85)		
>20	3 (6.52)	13 (8.72)	16 (8.21)		
Frequency of intake of medication				0.4970	0.481
Everyday	43 (93.48)	143 (95.97)	186 (95.38)		
Sometimes	3 (6.52)	6 (4.03)	9 (4.62)		
Number of those who checked BP outside hospital				0.7315	0.392
Yes	16 (34.78)	42 (28.19)	58 (29.74)		
No	30 (65.22)	107 (71.81)	137 (70.26)		
Other chronic medical conditions				0.5387	0.463
Yes	20 (43.48)	74 (49.66)	94 (48.21)		
No	20 (56.52)	75 (50.34)	101 (51.79)		
Total	46 (23.59)	149 (76.41)	195 (100)		

***p<0.05 shows statistical significance**

4.1.3 Anthropometric Measurements

Table 4. 4 shows the anthropometric measurements of the study participants. Most of the males 41 (89.13%) had normal waist circumference while the rest had abdominal obesity. There was a significant difference between the waist circumference of both genders p<0.001.

In general, a great number of the participants were either overweight or obese 151 (77.4%). There was a significant difference between the Body Mass Index (BMI) of the participants distributed by gender p = 0.023.

Table 4. 3: Anthropometric Measurements

Variables	**Number of participants, N =195 (100%)**			χ^2	**p-value**
	Male	**Female**	**Total**		
Waist circumference				34.5181	*<0.001
Normal	41 (89.13)	59 (39.60)	100 (51.28)		
Abdominal obesity	5 (10.87)	90 (60.40)	95 (48.72)		
BMI (kg/m^2)				5.1438	*0.023
Normal	16(34.78)	28(18.79)	44(22.56)		
Overweight/Obese	30(65.22)	121(81.21)	151(77.4)		
Total	46(23.59)	149(76.41)	195(100)		

***p<0.05 shows statistical significance**

Waist circumference: Male < 104cm = normal ≥ 104 = abdominal obesity
Females < 88cm = normal, ≥ 88cm = abdominal obesity

Body Mass Index: <24.9 kg/m^2 = normal
>25 kg/m^2 = Overweight/obese

4.2 Levels of Adherence to Antihypertensive Medications

4.2.1 Determining the level of adherence

This section determined the level of adherence to antihypertensive medication using the Morisky Scale of Medication Adherence. The scores were summed up with and subsequently grouped into 3 levels of adherence: high adherence (Score 8), moderate adherence (scores 6 to <8) and low adherence (scores <6). For this study adherence was defined as those who scored above 6. Associations were evaluated using Fisher's exact test because some of the cell values were less than 5.

4.2.2 Background Characteristics of the Level of Adherence

Table 4. 5 describes the socio-demographic characteristics of the participants and their levels of adherence to antihypertensive medications. Most of the participants 103 (52.82%), were low adherers while 91 (46.67%) were moderate adherers and only participant 1 (0.51%) was a high adherer.

There was a statistical significant association between the level of adherence and age groups ($p = 0.042$) and occupational status ($p < 0.001$) respectively.

Table 4. 4: Anthropometric Measurements

Variables	Level of adherence			Ƒ-test
	Low (<6)	Moderate (6<8)	High (8)	
Age groups (years)				*0.042
30-45	11 (10.68)	18 (19.78)	0 (0.00)	
46-60	42 (40.78)	24 (26.37)	0 (0.00)	
61-75	40 (38.83)	35 (38.46)	0 (0.00)	
<75	10 (9.71)	14 (15.38)	1 (100.00)	
Gender				0.304
Male	29 (28.16)	17 (18.68)	0 (0.00)	
Female	74 (71.84)	74 (81.32)	1 (100.00)	
Marital status				0.540
Never married / single	3 (2.91)	3 (3.30)	0 (0.00)	
Married	58 (56.31)	43 (47.25)	0 (0.00)	
Divorced/separated	12 (11.65)	10 (10.99)	0 (0.00)	
Widow/widower	30 (29.13)	35 (38.46)	1 (100.00)	
Educational level				0.804
No formal education	37 (35.92)	34 (37.36)	0 (0.00)	
Primary	20 (19.42)	13 (14.29)	0 (0.00)	
JHS/Middle school	22 (21.36)	25 (27.47)	1 (100.00)	
Secondary	17 (16.50)	13 (14.29)	0 (0.00)	
Tertiary	5 (6.80)	6 (6.59)	0 (0.00)	
Occupational status				*<0.001
Unemployed	37 (35.92)	42 (46.15)	0 (0.00)	
Employed	62 (60.19)	43 (47.25)	0 (0.00)	
Retired/pensioner	4(3.88)	6 (6.59)	1 (100.00)	

Ƒ – Fisher's exact test *p<0.05 shows statistical significance

4.2.4 Multivariate Analysis showing the Association between Adherence and Some Demographic Factors

Table 4.6 shows a multivariate analysis between age groups, gender, occupation and income.

Participants in the 30 – 45 years age group are 0.297 times as likely as those in the 46 – 60 years age group to be adherent OR 0.297 (95% CI 0.105 - 0.838). Similarly, the female participants were 2.8 times more likely to be adherent than the males OR 2.8 (95% 1.052 – 7.586) after adjusting for other variables.

Table 4. 5: Multivariate analysis showing the association between adherence and some demographic factors

Variable	Adjusted odds ratio	95% Confidence Interval	p-value
Age groups			
30-45 years	Ref	Ref	
46-60 years	0.297	0.105 - 0.838	*0.022
61-75 years	0.326	0.093 – 1.131	0.077
>75 years	0.305	0.030 – 3.123	0.317
Gender			
Male	Ref	Ref	
Female	2.824	1.052 – 7.586	*0.039
Employment Status			
Unemployed	Ref	Ref	
Retired/Pensioner	3.930	0.860 – 17.966	0.078
Income (GH₵)			
<100	Ref	Ref	
100-500	0.436	0.402 – 2.108	0.302
>500-1000	0.574	0.096 – 3.436	0.543
>1000	0.822	0.104 – 6.526	0.853

***p<0.05 Shows statistical significance**

4.3 Blood Pressure Control of Participants

4.3.1 Determining Blood Pressure Control of the Study Participants

This section presents the findings of the blood pressure control of the study participants. Those with a mean systolic blood pressure reading <140mmHg and mean diastolic blood pressure < 90mmHg was controlled.

4.3.2 Blood Pressure Control of Participants and some demographic Factors

Table 4.7 shows blood pressure control in relation to the socio-demographic characteristics. Most of the participants 118 (60.51%) had controlled blood pressure while the rest were uncontrolled hypertension.

There were more participants 56 (47.46%) in the older (61-75 years) age group who were controlled than the other age groups. This difference between those who were controlled and uncontrolled was statistically significant when distributed by age groups p=0.001.

More female participants 92 (47.18%) had controlled blood pressure than the male participants 26 (56.52%). There were more employed participants 57 (48.30%) who had controlled BP than those either unemployed 53 (44.92%) or retired/pensioners 8 (6.78%).

In addition, there was no statistical significant difference in the blood pressure control distribution between the income level (p=0.568) of the participants and those who either had valid NHIS or not (p=0.881).

Table 4. 6: Blood Pressure Control of Participants and some Demographic Factors

Variable	Controlled HTN 118 (60.51%)	Uncontrolled HTN 77(39.49)	χ^2	p-value
Age			**15.9554**	***0.001**
30-45	17 (14.41)	12 (15.58)		
46-60	28 (23.72)	38 (49.35)		
61-75	56 (47.46)	19 (24.68)		
>75	17 (14.41)	8 (10.39)		
Gender			0.4013	0.526
Male	26 (22.03)	20 (25.97)		
Female	92 (77.97)	57 (74.03)		
Employment status			3.8204	0.148
Unemployed	53 (44.92)	26 (33.77)		
Employed	57 (48.30)	48 (62.33)		
Retired/Pensioner	8 (6.78)	3 (3.90)		
Income (GH₵)			2.0231	0.568
<100	4 (6.15)	4 (7.84)		
100-500	38 (58.46)	35 (68.63)		
>500-1000	16 (24.62)	9 (17.65)		
>1000	7 (10.77)	3 (5.88)		
Valid Insurance			0.0222	0.881
Yes	108 (91.53)	70 (90.91)		
No	10 (8.47)	7 (9.09)		
Family History			0.0074	0.931
Yes	88 (74.58)	57 (74.03)		
No	30 (25.42)	20 (25.97)		
Total	118 (60.51)	77 (39.49)		

***p<0.05 shows statistical significance**

*GH₵ - Ghana Cedis
*HTN - Hypertension

4.3.4 Multivariate between Blood Pressure Control, MMAS and some Sociodemographic Characteristics

Table 4.8 shows the multivariate analysis between blood pressure control and some sociodemographic characteristics. Participants who were moderate adherers were 0.7 times less likely to be controlled than low adherers OR 0.707 (95% CI 0.369 – 1.266). Females were 0.7 times less likely to be controlled than males OR 0.744 (95% CI 0.363-1.522).

Table 4. 7: Multivariate between Blood Pressure Control, MMAS and some Sociodemographic Characteristics

Variable	Adjusted odds ratio	95% Confidence Interval	p-value
Level of adherence			
Low adherence	Ref	Ref	
Moderate adherence	0.707	0.369 – 1.266	0.226
Age groups			
30 – 45 years	Ref.	Ref.	
46-60 years	1.842	0.729 – 4.655	0.196
61-75 years	0.448	0.157 – 1.277	0.133
>75 years	0.675	0.182 – 2.506	0.557
Gender			
Male	Ref.	Ref.	
Female	0.744	0.363 – 1.522	0.418
Occupational status			
Employed	0.959	0.436 – 2.110	0.917
Unemployed	Ref.		
Valid NHIS			
Yes	1.109	0.367 – 3.350	0.855
No	Ref.	Ref.	

***p<0.05 shows statistical significance**

4.4 Barriers to Effective Management of Hypertension

This section addresses four aspects of the health belief model that was used in this study. These include: perceived severity, perceived susceptibility, perceived benefits and perceived barriers

Table 4.9 addressed questions on participants' perceived severity of hypertension. Perceived severity was investigated by asking the participants how serious they thought their condition was, their belief that hypertension can be cured, and if medications can be stopped when BP was controlled. In general knowledge about the severity of hypertension was good.

About a third of the participants 63 (32.31%) perceived that their blood pressure condition is extremely serious, 88 (45.13%) perceived that it was quite serious, 10 (5.13%) perceived that it was moderately serious while 17 (8.72) perceived that their condition was either little serious or not serious respectively.

On the other hand, most of the participants 134 (68.72%) knew that blood pressure could not be cured while 166 (85.13%) described their current status of hypertension as good control.

Overall their perception on susceptibility and benefit was good. Most of the participants 157 (80.51%) strongly agreed that antihypertensive medications will make them live longer while 144 (73.85%) of them strongly agreed that taking antihypertensive medications would prevent future high BP illness. The main reason identified by participants why they might not take their medications was cost of medications.

Table 4. 8: Variables that Assessed Participants' Perceived Severity, Susceptibility to Complications of Hypertension and Perceived Benefits and Barriers Antihypertensive Use

Variables	Frequency(N=195)	Percentage (%)
Perceived seriousness your condition		
Extremely serious	63	32.31
Quite serious	88	45.13
Moderate serious	10	5.13
Little serious	17	8.72
Not serious	17	8.72
High blood pressure can be cured		
Yes	46	23.59
No	134	68.72
Don't Know	15	7.69
You can stop blood pressure medication once blood pressure control is achieved		
Yes	50	25.64
No	137	70.26
Don't Know	8	4.10
Describe your blood pressure currently		
Good control	166	85.13
High	10	5.13
No problem	19	9.74
Taking blood pressure medication helps you live longer		
Strongly agree	157	80.51
Agree	33	16.92
Neither agree and disagree	2	1.03
Strongly disagree	3	1.54
Taking blood pressure medication improves the quality of your life		
Strongly agree	154	78.97
Agree	40	20.51
Neither agree and disagree	1	0.51
Taking blood pressure medication prevents future high BP related illnesses		
Strongly agree	144	73.85
Agree	48	24.62
Disagree	2	1.03
Strongly disagree	1	0.51
Taking blood pressure medication makes you feel worse		
Strongly agree	8	4.10
Agree	15	7.70
Disagree	43	22.05
Strongly disagree	129	66.15
Taking blood pressure medication makes you feel better		
Strongly agree	141	72.31
Agree	43	22.05
Disagree	4	2.05
Strongly disagree	7	3.59
Reasons why you may not take your medications		
Attitudes of health worker	4	2.05
Access to medications	59	30.26
Cost of medicines	75	38.46
Religious belief	1	0.51
Side effects of medicine	6	3.08
Forgetfulness	21	10.77
Others	29	14.87

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This section discussed the findings of the study in line with the objectives and how they relate to other results. The objectives were to determine the level of adherence to antihypertensive medications, assess the blood pressure control and barriers to the effective management of hypertension among hypertensive patients attending the Korle Bu Polyclinic.

5.1 Levels of adherence to antihypertensive medications

Evidence has shown that good adherence to antihypertensives results in a better hypertension outcome (DiMatteo, Giordani, Lepper, & Croghan, 2002) and many physicians are not sensitive to the fact that their patients may often not be adherent (Vinker et al., 2008). However, findings from this study shows that more than half of the study population were non-adherent to their antihypertensive medications. This result was lower than what was seen in a study conducted in another health facility in Kumasi where they observed that, about two-thirds of their participants were non-compliant with their medications during the study period (Harries et al., 2005). Also, a hospital-based study among hypertensive patients found a slightly lower non-adherence rate in Kano, Nigeria (Kabir et al., 2005).

More so, those who were in the 40-60 years and 61-75 years age group were less likely to adhere to antihypertensive medications when compared to those in the 30 – 45 years age group. But, Eisen (1990) had stated that sociodemographic characteristics such as age, may not be significantly associated with adherence (Eisen, 1990).

With respect to gender, females were more likely to adhere than males. This was in contrast from another study done in four primary care settings where they found that females were less likely to adhere to antihypertesnives (Vinker et al., 2008).

There were thrice as much female participants in the study than the male participants, which is similar to the pattern of general attendance at the Korle Bu Teaching Hospital (KBTH, 2011). A comparable pattern of male to female ratio have been documented worldwide. In a hospital-based study among hypertensive patients in four primary care centres in Accra, about 80% of their participants were females (Osafo et al., 2011). This disproportional ratio may be attributed to the health seeking behaviour of women, which is generally higher than that of men. It can also be further explained by the fact that the prevalence of hypertension in women older than 65 years is higher than that of men, therefore more women would have the condition (Kearney et al., 2005; Ladha et al., 2009; Roger et al., 2012). In addition, women have a higher life expectancy hence out-live their male counterparts (Epping-Jordan et al., 2004).

Although, this study investigated patient related factors which influence adherence there are others like social and economic factors, health care system, condition related and therapy related (WHO, 2003). Intentional non-adherence, an aspect of patient related factor occurs when the patient decides not to follow the treatment recommendations based on their perception about the condition (Lowry et al., 2005). To further explore this, four constructs from the HBM was used.

Perceived susceptibility relates to how participants felt they were at risk of complications of hypertension when they were non-adherent. Where perceptions of getting complications of uncontrolled hypertension are high, the more likely they are to adhere to antihypertensives and vice visa.

Many participants' in this study believed that taking antihypertensives would prevent future complications, improve quality of life and not make them feel worse but rather, make them feel better. The right knowledge about hypertension and its treatment creates a clear understanding and avoids confusion about the treatment course and the disease condition. Correct knowledge about hypertension was found to be high among the participants.

Furthermore, in order of significance, the prohibitive cost of medicines, access to medications and then forgetfulness were the most frequent reasons given by the study participants as reasons for non-adherence. This was contrary to the finding by Harris et al (2005) in Kumasi, where they found that forgetfulness was the commonest reason trailed by the unaffordable cost of the medications (Harries et al., 2005). Another hospital-based study of hypertensive patients in Kano, Nigeria, found that ignorance and lack of funds were the major reasons for non-adherence while only a small fraction of their participants acknowledged that forgetfulness was a reason (Kabir et al., 2005).

5.2 Other factors that were not associated with adherence to Antihypertensives

Other factors such as marital status, level of education of participants, occupation of participants, valid NHIS, frequency of taking these medications, the total number of antihypertensive medications used by participants, knowledge of hypertension and some patients' beliefs were not associated with adherence. Eisen (1990) indicated that adherence level was not associated with socio-demographic factors (Eisen, 1990).

About a third of the participants either believed that hypertension could be cured or did not know if it could be cured. This result showed that many participants were not aware of the chronic nature of the condition which can lead to non-adherence. A similar result was found by a study done in North Carolina, United States where they found 19% of

their participants thought that taking antihypertensive medications could cure hypertension and this misconception could result in poor medication adherence (Viera, Cohen, Mitchell, & Sloane, 2008).

A good number of the participants strongly agreed that taking antihypertensives would improve their quality of life. This result was lower than what was observed in the United States of America where they found that 95.4% of African Americans and 93.4% of Whites felt that taking these medicines would improve their quality of life (Kressin et al., 2007).

Cost of medications has been perceived as one of the important barriers of non-adherence to hypertension medications in Ghana (Buabeng, Matowe, & Plange-Rhule, 2004). However, this study found that despite the majority of its participants having valid NHIS, many of them still cited cost as the reason for non-adherence. Perhaps, having valid NHIS does not act as a significant buffer for out-of-pocket payment for medications. This may have resulted in about half of the participants not been adherent and uncontrolled. On the other hand, Salako et al (2003) in Ibadan, investigated the link between the supply of free antihypertensive medications and adherence among patients. Their result showed that there was no improvement in blood pressure control rate in spite of the free medication supplied to the participants and they subsequently concluded that the availability of free drug alone was not enough to improve adherence to antihypertensives (Salako, Ajose, & Lawani, 2003).

5.3 Blood pressure control of participants

More than half of the participants had controlled blood pressure in this study, similar to a hospital-based study in Japan (Ohta et al., 2011) where their patients achieved similar target blood pressure using intensive combination therapy of lifestyle modification and

medications. Likewise, another study in Ilorin, Nigeria found a control rate consistent with this study's rate (Olanrewaju et al., 2011).

Nonetheless, there was a difference with the observation of another hospital-based study done at the General-out Patients Department (GOPD) of a teaching hospital in Lagos, Nigeria, which found a lower control rate of 21.21% and they attributed their finding to the low earning capacity of their participants (Mbada et al., 2010). Though participants in this study had a similar low earning capacity, with about 40% of them been unemployed and the majority of those who had a monthly income earned GH₵100-500 (< $110 monthly as at time of study). The fact that almost all the participants were enrolled in the NHIS could have contributed to the high control rate. This can be supported by a study that was done in the United States of America, which found that their clients older than 53 years had a significant positive association between low income and controlled hypertension. This was so because those with low income were more likely to have health insurance, which could improve adherence and subsequently blood pressure control (Morenoff et al., 2007).

The majority of the participants had a family history of hypertension buttressing the fact that 30-60% of people with hypertension have a familial predisposition (Addo et al., 2012; Rayner, 2010b). This contrasts with a study done in South- Eastern Nigeria, where they recorded a family history of in a quarter of their participants. However, a family history of hypertension did not have a statistical significant association with either adherence or blood pressure control.

In this study, older age and increasing educational level were not independent predictors of blood pressure control. In contrast, a study done in Chicago in the United States of America where they documented that control of hypertension was higher in

neighbourhoods with high proportions of older persons, higher education and living in affluent neighbourhoods (Morenoff et al., 2007).

Correct knowledge about the seriousness of hypertension was noted in a majority of participants. This result was higher than what another study observed among African Americans and white Americans in the United States of America (Kressin et al., 2007). The high perception that the condition was serious, could have accounted for the high control rate observed in this study, though this association was not statistically significant. In addition, over 90% of the participants felt that their blood pressure control was either good or no longer a problem. Though higher than what was found by Kressin et al (2007), this did not reflect on the blood pressure control rate.

The majority of the participants agreed that it was very likely that taking antihypertensive medications would reduce their susceptibility to developing complications of hypertension. This was comparable to Kressin's study where she studied both African Americans and Caucasians (Kressin et al., 2007). Individuals' perceived susceptibility would improve medication adherence and eventually blood pressure control.

Most of the participants in this study were either overweight or obese and had abdominal obesity. Contrary to the findings from various studies which have linked overweight, obesity and abdominal obesity to poor blood pressure control in this study did not find any statistical significant association between anthropometric measurements and blood pressure control (Chaix et al., 2010; Mbada et al., 2010; Morenoff et al., 2007; William, 2010). The Women's Health Study of Accra, Wave II (WHSA-II) which was done between 2008-2009 in Accra, Ghana found that most of their subjects were either overweight or obese, a finding comparable to this study. They

also found that the majority of their participants had abdominal obesity this was also akin to the findings of this study (Benkeser, Biritwum, & Hill, 2012). Likewise, another study done in a teaching hospital setting in Abuja, Nigeria, found that majority of their participants were either overweight or obese (Ojji, Ajayi, Mamven, & Alabi, 2012).

5.4 Limitations of the study

The following are the limitations of the study;

1. This was a cross-sectional study, so findings reflect only what was going on at that point in time.
2. This study was a hospital-based study as such the findings of this study cannot be generalized to the larger population.
3. The Morisky Medication Adherence Scale is a self-reported scale so responses may be over or under estimated.
4. In addition, recall bias and attempts to please the healthcare provider may have influenced patients' responses to the questions.
5. This study also assumed that patients' information about their condition are accurate.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This study investigated how patients with hypertension managed their condition at the Korle Bu Polyclinic. Based on the findings of the study, conclusions and recommendations have been made.

6.1 Conclusions

The findings from the study showed that there were many participants who had poor adherence behavior. Younger age and being female were significantly associated with better medication adherence.

The blood pressure control rate was relatively higher than results from other studies. Also, not all the study participants had good knowledge of hypertension; the severity of the condition, the prevention of complications by taking antihypertensives and the chronic nature of the condition. However, factors such as age, gender, level of education of participants, occupation of participants, valid NHIS, marital status, knowledge of hypertension, some of patients' beliefs and motivations by participant were not found to be significantly associated with blood pressure control.

Though, most of the participants had valid NHIS, the main barrier to the management of hypertension was cost of medications. Other reasons were lack of access to medications and forgetfulness.

6.2 Recommendations

There are several dire implications of the low level of antihypertensive adherence and poor blood pressure control observed among the majority of the participants. To forestall this, a team approach involving all stakeholders in the management hypertension should encouraged. These stakeholders include health professionals such as doctors, nurses and health promoters, the family and the community.

The following recommendations are intended to contribute to optimizing the management of hypertension in primary health facilities.

Clinical practice and patient factors

1 Health care professionals must educate hypertensive patients about their condition specifically emphasising on the chronic nature of the condition, severity of the disease, how their medications work and the consequences of non-adherence with treatment. Patients should be taught how to interpret their blood pressure readings as this will promote their active participation in the management of the condition.

2 Health education on hypertension should be done through posters, pamphlets and durbars at health facilities in addition to health talks given. This will help emphasize on the hypertension.

3 Health facilities can develop systems that will help remind patients with hypertension to take their medications e.g. using m-health technology. They can leverage on the increasing availability of mobile phones in Ghana to support the patients' health by sending reminders on mobile phones. This can also be done using emails for those with access to the internet.

Patients and the support system

Significant others such as family members and friends can be used to help remind patients to take medications daily.

Health Policy

1. There is a need for government to ensure that the NHIS covers medications that are used in the management of hypertension as this will reduce the out of pocket payment burden for medications. This will eventually be cheaper for the scheme than paying for the treatment of the complications of the condition from poor control.
2. Allocation of resources to further explore (research) how patients manage hypertension in the communities is most timely as this will improve the understanding on how to approach counselling of patients.

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APPENDICES

APPENDIX 1: CONSENT FORM

Management of blood pressures by hypertensive patients attending Korle Bu Polyclinic

Principal investigator: Osa Olayemi

This consent form explains the study you are about to take part in. I would like you to read or have someone read it to you, so that you can understand the study. You may ask for clarification of anything you do not understand. Approval was sought from GHS Ethical Review Committee.

The benefit of this study is that, it will help to understand how people who have hypertension manage their condition. You will be asked questions about yourself and how you feel about this condition. In addition, your blood pressure, waist circumference, height and weight will be measured. Completing the questionnaire and the taking your blood pressure, height, weight measurement will take about 30 minutes.

You may have discomfort from the blood pressure and height measurement and may spend more time during this consultation, but there is little or no possible risk involved. The results from the analysis the questionnaire will help doctors take better care of people with hypertension. All the information you have provided are confidential.

Your participation in this study is completely voluntary. If you do not want to participate, there will be no consequences. You may refuse to part-take in the study any time. The quality of care will not be affected in any way should you refuse to take part in this study.

For further inquiries please contact Osa Olayemi of School of Public Health, University of Legon on 0206301711 and Ghana Health Service Ethical Review Committee Administrator; Madam Hannah Frimpong on 0243235225 or 0507041223.

I have read the information above, or the above information has been read to me. I have understood the information therein. I voluntarily give my consent to participate in this study and I understand that I can withdraw at any time without any adverse consequences to my health care.

_____ _____

Signature Thumb print

Date __/__/__

I certify that the risk and benefits of taking part in this study have been explained to the individual whose signature/thumbprint appears above.

_____

Signature of Principal investigator/witness Date__/__/__

APPENDIX 2: QUESTIONNAIRE

Management of Hypertension by Patients attending Korle Bu Polyclinic

SECTION 1. DEMOGRAPHIC DATA

1. Age (completed years) _____
2. Gender
   1) Male [ ] 2) Female [ ]
3. Where do you live? _____
4. Religion
   1. Christian [ ]
   2. Moslem [ ]
   3. Traditional African Religion [ ]
   4. Other, specify [ ] _____
5. Marital status
   1) Never married [ ]
   2) Married [ ]
   3) Divorced [ ]
   4) Separated [ ]
   5) Co-habiting [ ]
   6) Widow/widower [ ]
6. Educational status
   1) Never been to school [ ]
   2) Primary [ ]
   3) JSS/Middle [ ]
   4) Secondary/Senior High [ ]
   5) Vocational/Technical [ ]
   6) Tertiary [ ]
   7) Other, specify [ ] _____
7. Occupation _____
8. Tribe_____
   1) Ga/Adangbe [ ]
   2) Akan [ ]
   3) Ewe [ ]
   4) Hausa [ ]
   5) Other, specify [ ]

SECTION 2.0: SOCIO-ECONOMIC STATUS

9. Income per month in GHC _____
   1) <100 [ ]
   2) 100-500 [ ]
   3) >500-1000 [ ]
   4) >1000 [ ]
   5) Not applicable [ ]
10. Do you have a valid health insurance?

1) Yes [ ] 2) No [ ]

SECTION 3: HYPERTENSION HISTORY

11. How long have you had hypertension?_____

12. How many drugs are you on?
    1) One [ ]
    2) Two [ ]
    3) Three [ ]
    4) Four [ ]
    5) Five or more [ ]
    6) None [ ]

13. How do you take them?
    1) Every day [ ]
    2) Sometimes [ ]
    3) Weekly [ ]
    4) Fortnightly [ ]
    5) Other, specify [ ] _____

14. Do you check your blood pressure outside the hospital?
    1) Yes [ ] 2) No [ ]

15. Do you have a family history of hypertension?
    1) Yes [ ] 2) No [ ]

16. If yes who? **(You may choose more than one option)**
    1) Father [ ]
    2) Mother [ ]
    3) Sibling [ ]
    4) Other, specify [ ] _____
    5) Not applicable [ ]

17. Do you have any other chronic medical condition?
    1) Yes [ ] 2) No [ ]

18. If yes, what condition? **(You may choose more than one option)**
    1) Diabetes mellitus [ ]
    2) High cholesterol [ ]
    3) Obesity [ ]
    4) Kidney disease [ ]
    5) Heart disease [ ]
    6) Liver disease [ ]

7) Osteoarthritis [ ]
8) Asthma [ ]
9) Ulcer disease [ ]
10) Thyroid disease [ ]
11) Other, specify [ ] _____
12) Not applicable [ ]

SECTION 6: ANTHROPOMETRIC MEASUREMENTS

19. Weight_____ Kg
20. Height_____ meters
21. Waist circumference_____ cm
22. BMI_____ Kg/m^2

SECTION 7: BLOOD PRESSURE

23.

BP	1st reading	2nd reading	3rd reading	Mean
Systolic (mmHg)				
Diastolic (mmHg)				
Pulse rate (bpm)				

SECTION 8: PERCEPTION OF HYPERTENSION

24. How serious do you think high blood pressure is, in general?

1. Extremely serious [ ]
2. Very serious [ ]
3. Moderately serious [ ]
4. Little serious [ ]
5. Not serious [ ]

25. Do you believe high blood pressure can be cured?

1. Yes [ ]
2. No [ ]
3. Don't know [ ]

26. Do you believe that blood pressure medication can be stopped once blood pressure control is achieved?

1. Yes [ ]

2. No [ ]
3. Don't know [ ]

27. Do you believe that taking blood pressure medication will help you live longer?

1. Strongly disagree [ ]
2. Disagree [ ]
3. Neither agree nor disagree [ ]
4. Agree [ ]
5. Strongly agree [ ]

28. Do you believe that taking blood pressure medication will improve the quality of your life?

1. Strongly disagree [ ]
2. Disagree [ ]
3. Neither agree nor disagree [ ]
4. Agree [ ]
5. Strongly agree [ ]

29. Do you believe that taking blood pressure medication will prevent future high BP related illnesses?

1. Strongly disagree [ ]
2. Disagree [ ]
3. Neither agree nor disagree [ ]
4. Agree [ ]
5. Strongly agree [ ]

30. Do you believe that taking blood pressure medication will make you feel worse?

1. Strongly disagree [ ]
2. Disagree [ ]
3. Neither agree nor disagree [ ]
4. Agree [ ]
5. Strongly agree [ ]

31. Do you believe that taking blood pressure medication will make you feel better?

1. Strongly disagree [ ]
2. Disagree [ ]
3. Neither agree nor disagree [ ]
4. Agree [ ]
5. Strongly agree [ ]

32. If you did not take your blood pressure medication, how likely do you think it would be that you would develop other health problems over the next year?

1. Very likely [ ]
2. Likely [ ]
3. Unlikely [ ]
4. Very unlikely [ ]

33. If you did not take your blood pressure medication, how likely do you think it would be that your blood pressure would get worse over the next year?

1. Very likely [ ]
2. Likely [ ]
3. Unlikely [ ]
4. Very unlikely [ ]

34. How would you describe your blood pressure currently?

1. Good control [ ]
2. High [ ]
3. No longer a problem. [ ]

35. What are the reasons why you may not take your medications?

1. Attitudes of health workers [ ]
2. Access to medications [ ]
3. Cost of Medicine [ ]
4. Religious belief [ ]
5. Side effects of medicines
6. Others, specify_____

36. Do you take any traditional medicines apart from your high blood pressure medications? Yes [ ] No [ ]

SECTION 9: MORISKY's MEDICATION ADHERENCE SCALE (MMAS)

Please answer YES or NO

37. Do you sometimes forget to take your high blood pressure pills?

Yes [ ] No [ ]

38. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your high blood pressure medicine?

Yes [ ] No [ ]

39. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?

    Yes [ ] No [ ]

40. When you travel or leave home, do you sometimes forget to bring along your high blood pressure medication?

    Yes [ ] No [ ]

41. Did you take your high blood pressure medicine yesterday?

    Yes [ ] No [ ]

42. When you feel like your high blood pressure under control, do you sometimes stop taking your medicine?

    Yes [ ] No [ ]

43. Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?

    Yes [ ] No [ ]

44. How often do you have difficulty remembering to take all your medications? (Please circle the correct number)

    Never/Rarely.....0

    Once in a while.....1

    Sometimes.....2

    Usually.....3

    All the time.....4

Thank You!

APPENDIX 3 ETHICAL CLEARANCE