UNIVERSITY OF CAPE COAST

PERCEPTIONS OF HYPERTENSION AND ADHERENCE TO MEDICATION IN THE CAPE COAST METROPOLIS, GHANA

BY

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DECLARATION

Candidate's Declaration

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

Candidate's signature..... Date 23rd July 2018

Name: Julius Adong Waamsasiko

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

There is a growing concern about hypertension related complications such as stroke, heart attack, and sudden deaths among Ghanaians. These complications could be controlled with persistent adherence to anti-hypertensive medication and recommended lifestyle modifications. Though effective anti-hypertensive medicines are readily available in Ghana, the level of medication adherence among patients is reportedly low. This thesis assesses patients' perceptions of hypertension and levels of medication adherence in urban Cape Coast Metropolis of Ghana.

The Self-Regulatory Model of illness was applied to assess patients' perceptions and medication adherence. Data was collected from 350 adult hypertensive patients from three main public hospitals. This was followed with in-depth interviews for four adherents and four non-adherents, purposively selected out of the 350 patients after baseline analysis. Quantitative data was analysed using the Chi-square model and content analyses procedure for the qualitative survey.

Twenty-two percent (22%) of the sample were adherent to medication. Patients at age 70 years plus, understanding treatment instructions, home blood pressure checks, and perceptions that hypertension is intermittent were found to significantly associate with medication adherence. Perceived appearance of symptoms, side effects of anti-hypertensive, and preference for herbal preparations were among the key reasons for medication non-adherence. As part of the consultation process, doctors and nurses should address misconceptions of hypertension. There is a need to intensify patient education about risks of complications due to medication non-adherence.

KEY WORDS

Adherence

Cape Coast

Ghana

Hypertension

Medication

Perception

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DEDICATION

To my mother, Akonor Ayinpoka, though she never attended school, she was my first teacher. I remember she taught me how to scribble when I could barely write.

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BMI	Body Mass Index
BP	Blood Pressure
CDC	Centre for Disease Control
GDHS	Ghana Demographic and Health Survey
GHS	Ghana Health Services
HBM	Health Belief Model
HBP	High Blood Pressure
HINARI	Health InterNetwork Access to Research Initiative
IPQ-R	Revised Illness Perception Questionnaire
JNC 8	Joint National Committee
JSTOR	Journal Storage
MMAS	Morisky Medication Adherence Scale
MOH	Ministry of Health
NGO	Non-Governmental Organisation
NCGC	National Clinical Guideline Centre
NHIS	National Health Insurance Scheme
NVIVO	Qualitative data software
SCT	Social Cognitive Theory
SPSS	Statistical Package for Social Science
SRM	Self-Regulatory Model
SSA	Sub-Saharan Africa
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
WHL	World Hypertension League
WHO	World Health Organisation
UN	United Nations
USA	United States of America

CHAPTER ONE

INTRODUCTION

Background to the Study

Hypertension is one of the leading risk factors for global mortality, a major cause of cardio vascular diseases and accounts for about 13 percent of global deaths. Poor adherence to treatment is said to have contributed to the 9.4 million global deaths and 7 percent of the global disease burden in 2010 (World Health Organisation [WHO], 2014a, 2013). Though primary hypertension is not curable, it is controllable if patients persistently adhere to their recommended therapies. However, a third of global hypertensive patients are unable to adhere to medication and lifestyle modifications for effective blood pressure control (WHO, 2014b, 2013; Horne, Clatworthy, Hankins. 2010). This study examines the perceptions, level and determinants of adherence to hypertension medication in an urban population of the Central Region of Ghana.

Hypertension is a condition in which the body's blood circulating vessels are subjected to persistent rise in pressure. Primary hypertension is defined as when at least two readings of blood pressure on two or more subsequent visits consistently exceeds 140/90 mmHg in non-diabetic patients (Paul, Suzanne, Barry, William, Cheryl 2013; National Clinical Guideline Centre [NCGC], 2011; Ministry of Health [MOH], 2010). Hypertension is fatal and may lead to serious complications and damages to the internal body organs. Notable complications of hypertension include stroke, heart failure, and renal disorders. It causes eclampsia in pregnancy, resulting in rising incidence of foetal and maternal deaths (WHO, 2014a, 2013; Center for Disease Control and Prevention [CDC], 2012; Maryon-Davis & Stewart, 2005).

Prevalence of hypertension

There has been a shift in the global disease pattern from infectious diseases to rising prevalence of non-communicable diseases, including diabetes, hypertension, and cancer (WHO, 2014). Hypertension is among the leading risk factors for global diseases, accounting for seven percent of the disease burden in 2010 (WHO). The global prevalence of hypertension was estimated at 22 percent for the adult population of 18 years and above in 2014, with Europe recording 41 percent and the United States of America (USA) recording 35 percent (WHO, 2014a, 2013, 2012a). Countries in the Gulf regions reported comparatively lower prevalent rates, with 25 percent in Saudi Arabia and 20 percent in Kuwait. The highest prevalence occurred in sub-Saharan Africa (SSA) in 46 percent of the adult population (Al-Said, 2015; WHO).

A review of studies between 1993 and 2013 provides estimates for the prevalence of hypertension across Africa, to a range between 9 and 70 percent (Kayima, Wanyenze, Katamba. Leontsini, & Nuwaha, 2013). Awareness of hypertension was estimated at 11 to 40 percent of the population, treatment rates between 3 and 60, and control rates as low as 0 to 45 percent in sub-Saharan Africa (Adeloye & Basquill, 2014; Kayima et al. Bosu, 2010).

Hypertension was reported in Ghana before independence between 1898 and 1960 from the work of Edington and Binder; pathologists of the then Medical Research Institute of the Gold Coast (Biritwum, Amoah, & Pobee 2005). It was cited between 1950 and 1960 as the main cause of cardiovascular morbidity and mortality in hospitals in Accra and Kumasi (Biritwum, Amoah, & Pobee 2005; Akosa & Armah, 2005). Estimates of the crude prevalence of hypertension in Ghana from 2003 to 2014 fall between 19 and 48 percent of the

adult population of 18 years and above (WHO, 2014a; Awuaha, Anarfia,, Agyemang, Ogedegbe & Aikins, 2014; Addo et al., 2012; Bosu, 2010; Kunutsor & Powles, 2009; Agyemang & Owusu-Dabo, 2008). Institutional out-patient cases at health facilities excluding Korle-Bu and Komfo Anokye Teaching Hospitals increased from 60,000 in 1990 to about 600,000 in 2009 (Bosu). Furthermore, about 25 percent of all deaths and 62 percent of stroke cases in 2011 at the Komfo Anokye Teaching Hospital in Kumasi were attributed to hypertension (Hypertension and Diabetes on the upsurge in Kumasi, Ghana News Agency [GNA], 2011).

Studies on awareness, treatment and control rates have been reported in Ghana, with control rates of 1.7 to 13 percent in various parts of the country, including Accra and Kumasi (Bosu, 2015; Addo et al., 2012; Agyemang, Bruijnzeels, & Owusu-Dabo, 2006; Spencer, Phillips, & Ogedegbe, 2005; Cappuccio et al., 2004). In spite of evidences of high prevalence and low blood pressure control, hypertension in Ghana has not received adequate attention by governments, as there is no specific national policy to control the disease (Bosu, 2012, 2010). Calls have been made for policy interventions, but national response has been slower than expected (Bosu, 2012; Aikins, 2007; Biritwum et al., 2005; Cappucio et al., 2004).

The low levels of blood pressure control has been attributed to poor medication adherence, which is influenced by factors such as the rising preference for herbal preparations, cost of orthodox medication, perceived adverse effects of drugs, negative perceptions of hypertension, and beliefs in faith healing (Adeloye & Basquill, 2014; Kayima et al, WHO, 2013; Bosu, 2010; Buabeng, Matowe & Plange-Rhule, 2004. Unaffordable cost of anti-

hypertensive medicines has led to poor treatment outcomes, as it affects the patient's ability to adhere to prescribed treatment (WHO). Ghana has a health financing scheme which provides free generic anti-hypertensive medicines to patients. However, there are reports of low medication adherence among high blood pressure patients (Boima et al., 2015). Other possible explanations for the low rates of blood pressure control include the negative perceptions about treatment (Botchway, 2014; Bosu). Patients' negative perceptions of the condition may attribute to the low adherence to medication.

Patient's perceptions of illnesses

According to the Self-Regulatory Model (Leventhal, Leventhal, Contrada, 1998), patients form their own beliefs and perceptions about the symptoms, causes, and treatment of illnesses. Emotions, treatment side effects, and stress further influence perceptions. Such beliefs and perceptions may change patient preferences for alternative care such as herbal and spiritual interventions (Jin, Sklar, Oh, Li 2008). Negative illness perceptions about diseases have been associated with poor medication adherence, leading to slow recovery, disability and increased complications (Petrie & Weinman, 2012; Galli, Ettlin, Palla, Ehlert, & Gaab, 2010). Consequently, when patients' negative perceptions of their illnesses are addressed it might improve treatment in illnesses including high blood pressure (Morgan, Villiers-Tuthill, Barker & McGee, 2014; Petrie, Cameron, Ellis, Buick, Weinman, 2002).

Understanding patients' perceptions and beliefs about the illness revolves around established concepts. Patients are known to conceptualise their illnesses along different dimensions such as the identity or symptoms, whether the disease is treatable within a short time or life-long, and whether it is

controllable using medicines or by personal abilities. Other concepts are perception of the expected consequence or threat of the disease, emotional response to the diagnosis, and the degree of coherence (Petrie and Weiman, 2006). In some studies, patients who hold high perceptions of the symptoms that identify the illness, and those with high beliefs in the treatment, are more likely to adhere to treatment such as asthmatic and hypertension (Chen, Tsai, & Chou, 2011; Jossep & Rutter, 2003). Other studies however, have found no relationships between identity and medication adherence in diseases such as heart failure and diabetes (Molloy et al., 2009; Searle, Norman, Thompson, & Vedhara, 2007).

For example, a study to change negative beliefs about asthma medication used text messages to explain the risk of not accepting treatment. The intervention which focused on education resulted in attitudinal change, which later improved adherence in patients (Petrie, Perry, Broadbent, & Weinman 2011; Karamanidou, Weinman, & Horne, 2008). In another study, Keogh et al. (2011) used education to change perceptions about diabetes by modifying patient beliefs about diabetes, leading to improved outcomes. Thus, changing patients' misconceptions about hypertension may reduce medication non-adherence.

Non-adherence or poor adherence refers to the situation in which the patient intentionally or unintentionally fails to follow the prescribed medication and lifestyle instructions, having agreed to the plan. Poor adherence has been shown to affect treatment outcomes, quality of patient life, increase in complications and premature deaths (Addo, Smeeth, & Leon, 2009; Sandra van Dulmen et al., 2007; WHO, 2003). Poor adherence is a global challenge,

affecting about 50 percent of patients in developed countries, but at higher levels in less developed economies. Reasons for poor adherence to treatment include forgetfulness, adverse effects of medicines, unaffordable cost of medicines, and negative beliefs and perceptions about treatment (Addo et al., 2012; Haynes, Ackloo, Sahota, McDonald & Yao, 2008).

Factors which explain adherence behaviour are grouped as patient related, health system related, disease related, as well as socio-economic and therapy related. Issues regarding patient age, educational status, marital status, and gender relationships with medication adherence have been discussed in some studies. However, findings about these variables are still debatable. Exploring these factors will provide information to address poor adherence behaviour among some hypertensive patients in the Cape Coast Metropolitan area of Ghana.

Problem Statement

Available evidence from reports of population and institutional based studies which were conducted in Ghana between 1977 and 2015, points to rising trend in hypertension prevalence from 4.5 percent to 54 percent in various segments of the population in Accra, Kumasi, and the Kassena-Nakana district of Northern Ghana (Duah, Werts, Hutton-Rogers, Amankwa, Otupiri, 2013; Addo et al., 2012; Bosu, 2010; Kunutsor & Powles, 2009; Agyemang & Owusu-Dabo, 2008; Addo, Amoah, & Koram, 2006; Pobee,, Larbi, Belcher, Wurapa, & Dodu, 1977). The World Health Organisation also estimated an age-adjusted national hypertension prevalence of 29 percent for the adult Ghanaian population (WHO, 2014a). Though awareness rates are between 22 and 54 percent in the population, between 7 and 31 percent of the hypertensive

population receive treatment (Bosu, Addo et al, Agyemang et al., 2006; Cappuccio et al., 2004). Of those who receive anti-hypertensive treatment, between zero and 13 percent are reported to attain controlled blood pressure (Addo et al., 2012, 2006; Bosu, Spencer et al., 2005; Cappuccio et al.; Amoah, 2003).

One of the identified causes of the low blood pressure control in Ghana is poor adherence or non-compliance to treatment (Bosu, 2010; Buabeng et al., 2004). Some studies have linked higher odds of blood pressure control to higher medication adherence, and that successful blood pressure control reduces morbidity, complications, mortality, and reduces cost of care (Lee et al., 2013; Addo et al., 2009; Sandra van Dulmen et al, 2007). A second possible factor for the low levels of medication adherence among hypertensive patients in Ghana relates to negative perceptions about the condition (Bosu). A study by Spencer et al. (2005) concluded that patients' misconception about curability of hypertension could affect long term adherence to treatment. In contrast, a study by Botchway (2014), found that though patients may have positive perceptions of anti-hypertensive medication, they are failing to adhere to treatment regimens.

Consequently, adherence levels remain low in Ghana, ranging between 7% and 33% according to Kretchy (2014) and Boima et al. (2015) respectively. Though Governments in recent years have made efforts through the National Health Insurance Scheme (NHIS) to improve the health of hypertensive patients, the reasons for the low medication adherence among patients in Ghana are not clearly established. Furthermore, the levels and determinants of adherence to hypertension therapy are less researched in the Central Region,

though the region is among the top four with high prevalence of hypertension besides, Greater Accra, Ashanti and Volta (Ghana Health Service [GHS], 2014). For example, the number of newly reported out-patient hypertension in Central Region rose from 65,288 to 122,697 between 2011 and 2013 (Central Regional Health Directorate, 2014).

Cape Coast, as an urban area, is noted for the increasing number of out-patient cases of hypertension in the region. Reported out-patient hypertension in the Metropolis rose from 3,920 in 2008 to 18,202 in 2010 (Cape Coast Metropolitan Hospital, 2012 & 2010). It was among the top four ranked new out-patient diagnoses reported between 2009 and 2012 (Cape Coast Metropolitan Hospital, Central Regional Hospital, 2011). However, research on antihypertensive medication adherence remain scanty.

Though the Metropolis is endowed with a number of public health facilities and the requisite health professionals, there are reports of poor patient attitude towards hypertension treatment. A review of studies in the country indicates that patients' show negative perceptions and have low knowledge of hypertension as well as its management (Anowie & Darkwa 2015; Botchway, 2014). According to Anowe & Darkwa over 95% of a sample of patients in the Cape Coast Metropolis showed poor knowledge about the causes, risk factors, prevention and treatment of hypertension. Additionally, 98% of the patients showed negative attitude and perceptions towards hypertension. Therefore, the questions that may arise from these reports include; what are the patients' views about hypertension and the treatment they receive? Are the patients adhering appropriately to their medications? What factors facilitate or limit medication adherence among the patients who patronise hospitals in the Metropolis? It is

the above missing gap that motivated the author to obtain information about patients' perceptions, experiences of hypertension, and the determinants of medication adherence in the Metropolis.

Objectives of the Study

The aim of the study was to explore the factors that associates with adherence to hypertension medication in the Cape Coast Metropolis.

The specific objectives were to:

1. Assess patients' perceptions of hypertension in the Cape Coast Metropolis;
2. Assess the level of adherence to hypertension medication among the patients;
3. Assess the factors that affect adherence to hypertension medication in the Cape Coast Metropolis; and
4. Explore the therapeutic experiences of patients with the management of hypertension.

Study Hypotheses

The study was guided by the following hypotheses:

1. H_0: there is no significant association between patients' perceptions of hypertension and medication adherence; and
2. H_0: There is no significant association between age, educational status, and adherence to hypertension medication.

These hypotheses were proposed against the background of the inconsistencies with respect to the influences of age, educational status, and perceptions on medication adherence. Reports indicate that hypertensive

patients above 60 years, for example, are less likely to adhere to treatment for such reasons as forgetfulness and poor vision (WHO, 2003). However, this claim is not consistent with some studies in Ghana, Nigeria, and China where patients above 60 years have been found to be better adherents (Lo et al., 2016; Boima et al., 2015; Laryea, 2013; Lee et al., 2013). It is generally assumed that higher education might relate positively with health outcomes since patients with higher education would understand the need to adhere to medication (Altindag, Cannonier, & Mocan 2011; Ikechuwku, Obinna & Ogochukwu, 2010; Braverman & Dedier, 2009; Harries, Twumasi-Abosi, Plange-Rhule, & Cappuccio., 2005). However, a study in Ghana has shown that patients with lower levels of education are rather more likely than those with higher educational statuses to adhere to treatment (Boima et al., 2015).

There is an ongoing debate on the influence of patients' perceptions on medication adherence. For example, there is the view that patients who have beliefs in their personal abilities to control hypertension are more likely to be adherent to treatment (Morgan et al., 2014; Chen, Tsai, & Lee, 2009). Other studies suggest otherwise, claiming that patients who assume they could personally control their blood pressure are less adherent to treatment (Ross, Walker, MacLeod, 2004).

Furthermore, patients who hold negative perceptions about their treatment are less likely to adhere to medication (Petrie & Weinman, 2012; Galli et al., 2010; Petrie & Weinman, 2006). But, other findings have linked beliefs in treatment with high medication adherence (Lo et al., 2016; Horne et al., 2013; Z̆ugelj et al., 2010). The inconsistencies regarding relationships between age, education, perceptions among other factors, and medication adherence,

informed the need to test the variables to determine the key factors that influence medication adherence in the Metropolis.

Rationale of the Study

Studies on hypertension in Ghana have focused primarily on assessing prevalence rates in some urban and rural populations (Addo, et al., 2012; Kunutsor et al., 2009; Agyemang et al., 2006; Amoah, 2003). A search using the key words hypertension, prevalence and high blood pressure in Ghana, on Google Search/Google Scholar, HINARI/PubMed Central, Ghana Medical Journal, and JSTOR sources identified studies on hypertension in Ghana between 1977 and 2015. The key issues found in these studies are the rising prevalence of hypertension albeit low rates of awareness, treatment and control, as well as the absence of national policy to give direction for hypertension prevention. Poor adherence to treatment has also been identified as a major cause for the low rates of blood pressure in Ghana (Addo, et al., 2012; Bosu, 2010; Buabeng et al., 2004).

There are few studies with reports on the extent of medication adherence among patients undergoing treatment for hypertension in the country. Data from the available studies show that the rate of adherence to anti-hypertensive medicines is between 7 and 48 percent. Some reports have cited high cost of medication, stress, negative perceptions, concerns about anti-hypertensive, use of herbal medicines and long patient waiting time at the hospitals as reasons for the low levels of adherence (Boima et al., 2015; Kretchy, 2014; Botchway, 2014; Laryea, 2013; Buabeng et al, 2004).

With the inception of the National Health Insurance Scheme, anti-hypertensive medicines are now affordable in Ghana. However, the level of

blood pressure control among patients is said to be low (Bosu, 2010, 2013; Addo et al., 2009). Health care providers require information about patients' medication adherence behaviour in order to improve the management of hypertension. Identifying factors that are more likely to lead to better medication adherence could help clinicians identify patients at higher risks of complications. However, there is information deficit about the factors that might be influencing patients' decisions to adhere to therapy. The study was expected to assess patients' adherence behaviour, and give insights into key factors that facilitate, as well as those factors that act as barriers of medication adherence to guide clinical care.

Furthermore, patients' perceptions of hypertension have been associated with low levels of adherence to treatment (Botchway, 2014; Spencer et al., 2005). Reports suggest patients hold beliefs that hypertension is curable (Spencer et al.,). Such perceptions could affect long term adherence to treatment since the condition requires lifelong therapy. Exploring patients' experiences about hypertension is usually necessary for interventions to improve adherence to the prescribed anti-hypertensive medication (Ogedegbe, Harrison, Mancuso, & Allegrante, 2004). Furthermore, understanding their perceptions about the condition would help to address misconceptions regarding treatment. Additionally, the findings would update the existing body of literature on the management of hypertension and propose areas for further research.

Organisation of the study

There are seven chapters in this thesis. The first chapter introduces the study, touching on the general background of hypertension including the global trends of the disease burden and fatalities. Further perspectives on trends of

hypertension in Ghana regarding issues of blood pressure control, perceptions and adherence are discussed. Included in Chapter One are the problem, objectives, hypotheses, rationale for the study, and the structure of the thesis.

Chapter Two reviews literature on the definitions, classifications, treatment options, and provides information on the global trends of hypertension. The chapter further discusses the factors that influence adherence to medication. Chapter Three discusses theoretical issues on patient health behaviours and introduces the Self-Regulatory Model as the conceptual framework which guides the study.

Chapter Four presents the methods of data collection, experiences arising from the field, and methods of data analysis. The fifth chapter presents findings about participants' perceptions of hypertension including discussions on patients' lived experiences with the management of hypertension. Chapter Six assesses patients' levels of medication adherence as well as the influences of demographic, social, and clinical characteristics on medication adherence. It discusses relationships among the variables, and provides answers to the study hypotheses. Finally, Chapter Seven provides a summary of the study, drawing conclusions from the findings, and recommendations for improved future patient care.

CHAPTER TWO

PERSPECTIVES ON HYPERTENSION AND FACTORS OF ADHERENCE

Introduction

This chapter discusses the classification and measurement of high blood pressure and gives account of current world hypertension trends. It reviews the factors of high blood pressure, policy on prevention, as well as the level of policy implementation in Ghana. It then reviews the factors that influence adherence to anti-hypertensive medication, which include patients' perceptions of the condition. It ends with a discussion on the issues regarding hypertension and their implications to health delivery in the country.

Classification of Hypertension

Normal adult blood pressure is measured by a systolic value lower or equal to 120 mmHg and a diastolic value less than or equal to 80 mmHg. Raised Blood Pressure which is known as Hypertension is a condition in which body blood pressure is persistently higher and above the normal range (Paul et al., 2013; WHO, 2013). In clinical practice, hypertension is defined in terms of blood pressure values. The commonest classification is that by the United States Eighth Report of the Joint National Committee [JNC 8] on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (Paul). According to the JNC 8, adults with blood pressure measurements greater than 120/80 mmHg to 139/89 mmHg can be classified as pre-hypertensive. Readings from 140/90 mmHg to 159/99 mmHg are in stage one hypertension, and those with blood pressure readings consistently at or above 160/100 mmHg are stage two hypertensive.

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Hypertension is further classified by determining whether it is caused by primary or secondary factors (NCGC, 2011). Primary hypertension is the type that develops from environmental and genetic factors, constituting about 90-95 percent of adult hypertension. Secondary hypertension is caused by an underlying health problem such as the existence of kidney, vascular, and endocrine diseases, as well as pregnancy related hypertension (Madhur & Maron, 2014).

Determinants of Hypertension

The factors that might cause high blood pressure are grouped into modifiable risk factors or lifestyle factors such as obesity, excess salt intake, excess alcohol consumption, smoking, low physical activity, and low intake of vegetables as well as fruits (WHO, 2014b, 2013; Gupta, 2011). These factors are termed modifiable because they are practices that are amendable. Subsequently, high blood pressure could be reversed where the individual makes efforts to change habits by adapting practices to reduce excesses (WHO, 2014b; Ibrahim & Damasceno, 2012). The non-modifiable risk factors are those that are inherited and are not reversible, they include ageing and family history of hypertension or hereditary (Gupta).

Measurement, Diagnosis and Treatment of Hypertension

Measurement of blood pressure is done by using devices such as the mercury sphygmomanometer, aneroid sphygmomanometer, electronic and ambulatory blood pressure monitors. The upper and the lower measures are the systolic and diastolic blood pressure values respectively (NCGC, 2011). High blood pressure is diagnosed or detected using various procedures, which include

direct measurement with the sphygmomanometer for baseline blood pressure values. It is also diagnosed using the patient's medical history as well as patient's self-reports of lifestyle behaviour or risk factors. There are intrusive procedures, which include physically examining the patient, carrying out routine laboratory examinations, performing Electrocardiogram, and doing chest radiography to identify possible organ damages induced by hypertension (NCGC; MOH, 2010).

Hypertension is diagnosed when at least two blood pressure readings on two or more subsequent visits, persistently exceed 140/90 mmHg in non-diabetic patients and 130/80 mmHg in diabetic patients (Paul et at., 2013; NCGC, 2011; MOH, 2010). The overall goal of treatment is to reduce blood pressure in order to avoid complications and premature death. The Ghana's Standard Treatment Guidelines provide a target goal for blood pressure to a level below 140/90 mmHg for adults and 130/80 for diabetes patients (MOH)

There are two main prescribed modes of treatment which aim at reducing blood pressure to target levels. These are the non-pharmacological care, which are lifestyle modifications and the pharmacological treatments which involve use of medicines. However, surgeries may become necessary to correct defects in arteries (MOH, 2010). Guidelines for the management of hypertension, including those of the MOH standard Treatment guidelines (Ghana) recommend lifestyle modifications as the first step in the management of hypertension when blood pressure is not excessively high (Paul et al., 2013; Shimamoto et al, 2014; NCGC, 2011;).

Recommended lifestyle changes include low salt intake, low animal fat consumption, low intake of alcohol, and cessation of tobacco smoking. Other

recommendations are reducing body weight to achieve body-mass index (BMI) of less than 25 kg/m^2 as well as regular consumption of fruits and vegetables. These measures contribute to lowering blood pressure. For example, a 10 kg weight loss induces approximately 2-20 mmHg reduction in systolic blood pressure; limiting alcohol intake to less than 30 mL of ethanol per day leads to reduction of 2-4 mmHg in blood pressure; and reducing salt intake by 2.4 g per day leads to reduction of 2-8 mmHg in systolic blood pressure (Madhur & Maron, 2014; Gupta, 2011).

There are reports of low adherence to the recommended lifestyle modifications such as less alcohol use, avoiding smoking, increased fruits and vegetable intake in Ghana (Amo-Adjei & Kumi-Kyereme, 2015; Doku, Darteh, & Kumi-Kyereme, 2013; Tagoe & Dake, 2008). Reduction in salt intake in some West African communities have been shown to significantly impact on lowering blood pressure (Cappuccio, Kerry, Micah, Plange-Rhule & Eastwood, 2006). However, there is low awareness about the benefits of reduced salt intake among patients. Knowledge about lifestyle modifications has been rated as average among some Ghanaian hypertensive patients. Patients who are aware of the modifiable lifestyle practices have difficulty avoiding salt, smoking, and alcohol intake (Marfo, Owusu-Daaku, Addo & Saana 2014; Cappuccio et al)

Hypertension may be controlled with effective use of anti-hypertensive medicines such as thiazide diuretics, calcium channel blockers, beta-blockers, angiotensin receptor blocker, and angiotensin-converting enzyme classes of medicines (WHO, 2013, Gupta, 2011; MOH, 2010). These are used to control blood pressure and prevent complications such as heart failure, stroke, and kidney failure. Patients who are undergoing treatment are required to take these

drugs on long-term basis (Madhur et al., 2014). However, anti-hypertensive medicines are expensive for patients in the low and developing economies, including Ghana. The effect of the high cost of medication has been cited among other factors for the poor rate of adherence to treatment (WHO, 2013; Gupta 2011; Buabeng et al., 2004).

Global Trends of Hypertension

Hypertension has become a global health challenge, impacting greatly on the economies of low to middle income countries (WHO, 2013). Estimates by the World Health Organisation, places hypertension among the leading risk factors for global mortality; it was the major cause of cardio vascular diseases, and accounted for about 13 percent of global deaths by 2010. The condition caused about 9.4 million deaths and 162 million years of life lost globally. The number of people who lived with the condition increased by 66 percent from 600 million to 1 billion between 1980 and 2008.

The global burden of diseases report, points to a shift in the world's morbidity pattern from communicable diseases to risk factors that cause non-communicable diseases in adults (WHO, 2014a, 2013). Hypertension was ranked the number one leading risk factor for global burden of diseases in adults in 2010 (Bromfield & Muntner, 2013; Lim et al., 2012). The effect of the change was greatest in sub-Saharan Africa and South Asia, where it accounted for 7 percent risk of disease burden. North Africa and the Middle East also experienced similar shifts in high blood pressure trends in 2010 (Lim et al.).

The impact of high blood pressure is reflected in the number of cerebrovascular and cardiovascular deaths across the globe. About 51 percent of stroke cases (cerebrovascular disease) and 45 percent of ischaemic heart

disease deaths were attributed to high systolic blood pressure (WHO, 2014a; 2013). The impact was largely felt in the low and middle income countries than the high income countries (Lim et al., 2012). Hypertension was reported to cause between 37 percent of cardiovascular deaths in the South-East Asia Region and 54 percent in middle-income European countries (WHO, 2009).

Another effect of the rising trends in hypertension involves the high cost of anti-hypertensive drugs. The high cost of anti-hypertensive to poor families affects their capacity to adhere to treatment, resulting in the high death and disability levels in poor countries. Furthermore, the rising prevalence of hypertension affects quality of life of people with hypertension. Persons living with hypertension for longer years are affected by physical weaknesses and mental deterioration (WHO, 2013). The effect of hypertension could be controlled through implementation of policies aimed at avoiding harmful use of alcohol, increase physical inactivity, weight reduction, reduced salt consumption, and improved medication adherence (WHO).

Trends of hypertension in Africa

Despite limitations in studies regarding sampling procedure, differences in case definitions, and computations, evidence points to rising prevalence of hypertension in African countries, with higher urban prevalence than in rural populations. For example, in a review of population based studies that spanned between 1973 and 2009, Addo et al. (2012) estimated the prevalence of hypertension to range from 19 percent in rural populations to 54 percent in urban areas of Ghana (Ogah & Rayner, 2014; Adeloye & Basquill, 2014; Kayima et al., 2013; Addo et al, Bosu, 2010). In sub-Saharan Africa, the prevalence rates vary widely among countries, ranging between 9 percent in younger adults and

70 percent in the older ages of at least 70 years (Adeloye & Basquill, Kayima et al. WHO, 2013). A projection of the hypertensive population in the sub region is expected to rise from 130.2 million in 2010 to.8 million people by 2030 (Adeloye & Basquill.).

Awareness, treatment and control levels are equally low in a number of SSA countries. Awareness ranges between 11 percent in Mozambique and 40 percent in Nigeria. Treatment rates range between 3 percent in Mozambique and 60 percent in Cameroon, while control rates are 1 percent in Mozambique and 25 percent in Cameroon; North Africa recorded higher levels of awareness and control while West and Central Africa reported lower awareness rates (Kayima et al., 2013).

The impact of hypertension is gradually shifting from high income countries to low income and middle income countries in South Asia and sub-Saharan Africa, according to WHO (2013). It has been observed that the global target of reduction in blood pressure levels is not likely to be achieved in these regions (Ezzati et al., 2015; WHO, 2014a; 2013). The low control levels have been associated with poor adherence to prescribed medication. Other possible reasons are the availability of alternate treatment, high cost of medicines, complaints about the perceived adverse effects of anti-hypertensive medication, faith in traditional healers, and low access to health facilities. Furthermore, male hypertensive patients are reported to reject anti-hypertensive for fear of becoming impotent (Odusola et al., 2014; Botcwey, 2014; WHO; Agyemang et al., 2012b; Aikins, 2007; Buabeng et al., 2004). The high impact of the rising trend of hypertension in Africa calls for policies to reduce prevalence, increase

awareness of the condition, and implement strategies to improve adherence and blood pressure control.

Prevalence of hypertension in Ghana

Hypertension was identified in Ghana during the Gold Coast era, but it gained prominence in the 1950s (Biritwum et al., 2005). Annual hospital based data and autopsy reports from Accra and Kumasi had consistently mentioned hypertension as the main cause of cardiovascular morbidity and mortality as well as the cause for 78 percent of cardiovascular deaths from 1898 to 1960 (Biritwum et al. Akosa & Armah, 2005). Beyond the institutional autopsy reports, community based studies were conducted in Greater Accra between 1970 and 1998, pointed to hypertension disorders as a major health concern. The Mamprobi Community Cardiovascular Morbidity and Mortality Study was one investigation that was conducted as part of efforts to quantify the prevalence and impact of hypertension in Ghana. The report estimated the prevalence of hypertension at 12.5 percent by 1975. Another study between 1972 and 1973 in Accra showed that 9.8 percent of public servants were hypertensive (Biritwum et al; Pobee, Larbi, Dodu, , Pisa, , & Strasser, 1979).

A national survey was carried out 1998 to assess the level of hypertension in the country reported a prevalence rate of 27.8 percent among adult Ghanaians. A number of studies reported regional prevalence rates such as 28 percent in Kumasi, 32 percent in Bawku, 36 percent in Keta-Dzelukope, and 47 percent among women in Accra (Aikins, 2007). Beyond the year 2000 a number of studies reported prevalence rates between 19 and 48 percent in both urban and rural areas, with higher rates in urban Ghana (Addo et al., 2012; Addo et al 2006; Bosu, 2010; Kunutsor et al, 2009; Aikins, 2007: Agyemang et al.,

2006; Biritwum et al., 2005; Buabeng et al., 2004; Amoah, 2003). The global status report of the World Health Organisation recorded a prevalence rate of 22 percent for Ghana in 2014 (WHO, 2014a).

These reports suggest high prevalence of hypertension but lower levels of awareness, treatment and particularly blood pressure control in the country. Some studies have estimated awareness of hypertension in the population to fall between 22 percent and 34 percent, treatment rates between 11 percent and 28 percent, and control rates of 1 to 12 percent (Bosu, 2015; Addo et al., 2012; Agyemang et al., 2006; Spencer et al., 2005; Capuccio et al., 2004; Amoah, 2003).

Reports have raised issues about the rising prevalence but lower rates of awareness, as well as treatment and control in the country. Though effective anti-hypertensive medicines are available, the low levels of blood pressure control in the country is a problem. Various explanations have been cited. Factors such as poor health systems, low education and literacy about hypertension, expensive medicines, poor adherence to treatment, and adverse effects of drugs have been identified to contribute to the lower treatment and control levels in Ghana (Addo et al., 2012). The simple notion is that hypertension is more prevalent in urban communities than in the rural communities, with higher awareness, treatment and control than rural areas. Affluence lifestyle and pressure of work have been stated to be the causes of the increasing prevalence of hypertension in the urban areas (Cappuccio et al, 2004).

In spite of the evidences from the institutional and community morbidity and mortality surveys, hypertension has not been given prominence

compared to infectious conditions (Aikins, 2007). The high prevalence of hypertension, but lower rates of awareness, treatment, and control suggest the need to formulate a national policy on hypertension, as well as health promotion programmes on public education against avoidable risk factors. The call for policy intervention has been long over-due (Bosu, 2012; Aikins, 2007; Cappucio et al., 2004). The issue about high cost of medication may not be important in Ghana today as the establishment of the National Health Insurance Scheme seems to provide solutions. Basic and generic anti-hypertensive are among the list of free medicines given to a larger proportion of patients. Therefore important issues for consideration are uncovering the causes of the low levels of medication adherence which include misconceptions about hypertension.

Perceptions of Diseases and Medication Adherence

Patients form their own thoughts or perceptions and beliefs about their illnesses as well as the treatment they wish to pursue. Their views are informed by factors such as past experiences with the illness, personal health knowledge, and experiences of other family or friends with similar illnesses. Other sources are information from health providers, the media as well as traditional beliefs about the condition (Petrie & Weinman, 2012; Petrie, Jago & Devcich, 2007). Petrie & Weinman. (2006) have observed that patient perceptions of their illnesses, if addressed, may aid the consultation process. Negative illness perceptions are known to relate to poor health outcomes (Petrie & Weinman, 2012). Patients who hold negative perceptions of their illnesses are associated with slow recovery, disability, and higher future fatalities (Petrie & Weinman, 2012; Galli et al., 2010; Kaptein et al., 2010).

Studies have also shown that patients' perceptions may change their response to treatment, and that patients sometimes prepare themselves towards unfavourable diagnoses until their concerns are proven to be wrong (Petrie & Wienman, 2012; Devcich, Ellis, Broadbent, Gamble, & Petrie, 2011). For example, Dickens et al. (2008) opine that depressed patients after heart attack feel their heart condition is unlikely to be cured.

Patients conceptualise their illnesses in different dimensions, which have been established as identity, cause, timelines, treatment or control, the risks or consequences, emotional response, and coherence (Petrie & Weinman, 2006). "Identity" refers to the name or the symptom used to identify the illness. It is the label patients place on their ill health. For example, high blood pressure may be labelled as "throbbing headache" and arthritis as "morning joint pain" (Kucukarslan, 2012, p.3). Hypertension is a condition which does not show symptoms according to medical knowledge, yet, patients relate it to a number of symptoms such as dizziness, headaches, chest pain, sleeplessness, fatigue, and rising heart-beat.

Though perceived symptoms of hypertension should not be totally ignored, they cannot be relied on as signs of hypertension (WHO, 2013) because, perceptions of symptoms may be different from the clinical assessment of the illness, and might not relate to the condition at all. The challenge to health providers has been how to address the negative perceptions about symptoms of hypertension in order to improve adherence.

Perceptions and beliefs about illnesses and treatment may affect adherence or compliance to medication (Kucukarslan, 2012; Ross et al., 2004; Moss-Moris, et al., 2002). For example, patients with stronger beliefs in asthma

symptoms are more likely to be adherent to treatment according to Jossep and Rutter (2003). Chen et al. (2011), have showed association between illness identity and adherence among patients in Taiwan. Other research studies have however, reported no association between illness identity and medication adherence in patients with heart failure and diabetes (Molloy et al., 2009; Searle et al., 2007). Though Halm, Mora, and Leventhal (2006) find strong patient beliefs of symptoms in asthmatics, they claim that the patients are less likely to adhere to treatment.

Perceptions and beliefs about causal factors have also been shown to influence adherence to medication (Chen et al., 2009). A study in Ghana to understand perceptions of illnesses strongly attributed the causes of hypertension to stress, fear, and "over thinking" (Aikins, Anum, Agyemang, Addo, Ogedegbe, 2012). In a review by Marshall, Wolfe, and Mckavitt (2012), patients believe that hypertension was caused by stress, and identified it through appearance of symptoms such as headache, dizziness, and sweating. The belief in appearance of symptom may affect medication adherence since some patients may avoid medication when symptoms disappear. Others such as Jessop and Rutter (2003) have found no association between chance, germs, pollution, and medication adherence among asthma patients.

"Timeline" beliefs refer to the duration of illness and whether it is curable within a short time or in the long term (Petrie & Weinman, 2006). Timeline beliefs may impact medication adherence particularly in chronic conditions such as hypertension and diabetes. Patients with acute timeline perceptions are more likely to stop medication even though the condition prevails. Those with chronic perceptions of hypertension, for example, are more likely to adhere to

treatment for a longer time. Leventhal et al. (1997) found that 58 percent of patients who hold beliefs in timeline acute dropped out of treatment compared to 17 percent dropout for those who perceive hypertension as chronic. Ross et al. (2004) found no association between timeline and medication adherence.

"Personal control" beliefs refer to beliefs in personal efforts at bringing the condition under control. Patients have challenges with adherence when their personal beliefs about the illness do not conform to the nature of the treatment (Petrie & Weinman, 2012). Ross et al. (2004) believe that patients who hold low perceptions of their personal abilities to control their illnesses are more likely to be adherent to medication, suggesting that these patients are less likely to seek alternate treatment. Chen et al. (2011) on the other hand claim there is positive relationship between high personal control beliefs and medication adherence among Chines hypertensive patients. In other words, those who believe in their personal efforts are also more likely to be adherent to mediation.

"Treatment control" beliefs, on the other hand, refer to patients' faith in their medication. Therefore, adherence to treatment may be affected when patients hold negative impressions about the ability of treatment to cure or control the illness. Some studies have shown improved medication adherence with treatment control beliefs in hypertension (Lo et al., 2016; Horne et al., 2013; Zˇugelj et al., 2010; Chen et al., 2009) and in diabetes (Searle et al., 2007).

"Consequences" refer to the perceived effects that the illness may have on work, family, income, and lifestyle. A patient's perception of severity or dangers of the illness may not be the same as the clinical interpretation. Ross et al. (2004) observe that patients with perceived serious consequence of hypertension are more likely to be adherent. On the contrary, patients with

beliefs in the consequence of asthma are less likely to be adherent to medication according to Horne and Weinman (2002). They suggest that patients who are more adherent to asthmatic medication are less fearful of the consequences of asthma. Other studies have reported non-significant associations between fear of consequence of illness and mediation adherence (Chen et al., 2011; Z̆ugelj et al., 2010; Jessop & Rutter, 2003).

Emotional response refers to worry, anxiety, anger, depression and fears of the illness when the patient is told the diagnosis. High emotional response to hypertension is found to be associated with low adherence to medication in younger patients below 60 years (Z̆ugelj et al, 2010; Ross et al., 2004). Other studies have found no significant relationship between medication adherence and emotion among elderly patients (Chen et al., 2009; Molloy et al., 2009).

Illness perceptions concepts are used to design interventions to guide patients' adherence behaviours and improve health outcomes (Kucukarslan, 2012). Petrie et al (2011) used text messaging intervention to modify negative beliefs about asthma medication, which resulted in significant change in beliefs and treatment adherence. Karamanidou et al. (2008) improved adherence to medication among renal patients by strengthening coherence or patients understanding of the need for regular intake of the medicine. A study by Keogh et al. (2011) showed that interventions using education to change perceptions about diabetes succeeded in modifying negative beliefs and led to improved

Adherence, Compliance, and Concordance

The concept of prescribing medication, and how patients behave towards medication instructions revolve around terminologies such as compliance, concordance, persistence, therapeutic alliance, and adherence (Horne, Weinman, Barber, Elliott, & Morgan, 2005). Generally, the paradigm shift in terminology is about the search for the right behaviours of prescribers toward patient care (Horne, et al., 2005). The terminologies are used in two main ways; first they are applied to describe diverse health behaviours such as maintaining a treatment programme, observing the correct use of prescribed medication, following appropriate lifestyle practices, and avoiding risk health behaviours.

Secondly, they focus on the consultation process between the doctor and the patient, and how closely patients follow the treatment prescribed for them. They refer to the ability and the willingness of patients to accept medication instructions and lifestyle modifications as recommended by health care providers. However, patient's ability to cope with medication instructions could be influenced by the appropriateness of the consultation process (Horne, et al., 2005). Therefore, the patient's readiness or willingness to strictly follow the prescribed medication may depend on the method of consultation. Though different labels, the concepts are similar and attempt to identify appropriate processes of consultation between the doctor and patient. The appropriateness of the process would promote willingness to follow the prescribed medication instructions and lifestyle modifications (Horne et al).

Though similar by implication, compliance, concordance and adherence are different approaches used to describe the doctor' consultation process and

patients' medication behaviour. The term Compliance is defined variously as "Patient's passive following of provider's orders (CDC, 2012, p. 5), "the extent to which the patient follows the health professionals' advice and takes the treatment" (Cushing & Metcalfe, 2007, p. 1048), "the extent to which patients follow doctor's prescriptions about medicines taking" (Horne et al., 2005, p. 12), and "the acting in accordance with, or the yielding to a desire, request, condition, direction, etc.; a consenting to act in conformity with; an acceding to; practical assent" (Aronson, 2007, p.385).

These definitions imply that in compliance, the patient is not involved in the prescribing process or decision-making regarding the type of medicines, the timing, and frequency of dosage. The patient is simply to take the orders of the prescriber. The patient is supposed to obediently follow the doctor's instructions, and therefore the non-compliant patient is seen as being disobedient to the doctor's instructions (Holme, 1993; Horne et al, 2005). Another limitation of compliance is the reference to the terms such as "prescription" and "medicines" in the various definitions. Use of these terms excludes other forms of therapy which are non-medicinal such as lifestyle practices (WHO, 2003). Other authors argue that compliance fails to take into account beliefs, expectations, and preferences of the patient (Horne et al).

Concordance is defined variously as: "an agreement reached after negotiation between a patient and a health care professional that respects the beliefs and wishes of the patient in determining whether and how medicines are taken" (Horne et al., 2005, p.33), "agreement between the patient and healthcare professional, reached after negotiation that respects the beliefs and wishes of the patient in determining whether, when and how their medicine is taken, and

(in which) the primacy of the patient's decision is recognized" (Cushing & Metcalfe, 2007, p. 1049). The definitions imply that the prescriber and the patient agree on how the medicines are taken. In this case, there is a two-way consultation where the prescriber and the patient share decisions regarding medication (Cushing & Metcalfe).

Concordance reflects the situation where the prescriber and patients agree on therapeutic decisions by considering the patient's beliefs and concerns about medicines, options, route of medication, and timing of dosage. If no agreement is reached, the patient's view is accepted so as to avoid non-concordance (Horne et al., 2005). In concordance, the prescriber respects the patient's right to take or not to take the prescription because, the concept is patient-centred rather than prescriber-imposition (Bell, Airaksinen, Lyles, Chen & Aslani, 2007).

One criticism against concordance is that it is not useful for scientific measurements and that there are no valid, acceptable, and reliable tools to measure concordance (Bell et al., 2007; Horne et al., 2005). For instance, it is difficult to establish whether or not patients adequately expressed their views during consultation. It is also difficult to determine whether the prescriber respected the patient's views about the illness and the medicines and whether there was a shared decision. Finally, concordance as a concept is more about the consultation process between the two partners and not about the individual's medication behaviour (Weiss & Britten, 2003).

The World Health Organisation describes adherence as "the extent to which a person's behaviour towards taking medication, following a diet, and or extent of lifestyle changes corresponds with agreed recommendations from a

health care provider". It involves a voluntary collaboration with a treatment plan agreed between the health provider and the patient, taking into consideration the beliefs and attitude of the patient (WHO, 2003). The term is also defined as "The patient's conformance with the provider's recommendation with respect to timing, dosage, and frequency of medication-taking during the prescribed length of time" (CDC, 2012, p. 5). It includes taking the medication at the required strength, in the proper dosage form, at the appropriate time of day and night, at the proper interval, and at the required duration of treatment (CDC). Adherence to medication therefore refers to the medication behaviour of the patient after the prescription has been determined by the prescriber, upon agreement and acceptance by the patient. In this situation the patient is not expected to opt out of treatment. Adherence is the preferred concept for this study because it involves an agreed plan to observe medication and lifestyle changes, which can be measured to determine the extent to which the patient follows the prescribed treatment.

Non-adherence occurs when the patient fails to adhere to the agreed recommendations for treatment. In pharmacotherapy, non-adherence is said to occur when patients do not take at least 80 percent of their anti-hypertensive prescribed courses (WHO, 2003). The non-adherent hypertensive patient is therefore prone to increased risk of complications, particularly organ damages and sudden death (Addo et al., 2009; Sandra van Dulmen et al., 2007). Poor or non-adherence also includes failure to observe recommended lifestyle changes, which include reduced alcohol intake, reduced sodium intake, and cessation of tobacco use (WHO). Non-adherence to prescribed treatment could be

"intentional non-adherence" and "unintentional non-adherence" (Horne et al., 2005, p. 64).

Unintentional non-adherents are patients who fail to take their medications or fail to adequately follow a lifestyle change programme because they have practical problems. They are affected by limitations such as forgetfulness, lack of money to refill medicines, unable to read prescription due to poor sight, and difficulty to remember complex regimens. Intentional non-adherence on the other hand, refers to patients who deliberately refuse to take medication as per the instructions. In such situation, patients may alter the dosage; others may take the medication as and when they deem appropriate; and some may refuse to take medication entirely. These actions are linked with patient's perceptions and beliefs, preferences, and past experiences with the medicines. Though their reasons may not be medical, they are important in the concept of medication behaviour (Petrie & Weinman, 2006; Horne et al., 2005).

Non-adherence is not attributed to patient related factors only, it is also attributed to health care factors. It may arise from poor treatment instructions, poor provider-patient relationship, patient disagreement with treatment, and side effects of medicines (Haynes et al., 2008). Inability to adhere to medication regime, and appropriate lifestyle changes could be caused by factors which are discussed in the following section.

Factors Influencing Adherence to Hypertension Therapy

Various reasons have been provided in attempts to explain adherence behaviour of patients toward hypertension therapies. These are grouped as patient related, socio-economic, therapy related, disease related, and health system related factors (Jin et al., 2008; WHO 2003).

Patient Factors and Adherence

Factors that are identified as patient related are the demographic characteristics which include age, sex, Body Mass Index, level of education, religious beliefs, and marital status. Other patient issues that affect adherence include health literacy, lifestyle, self-management practices, and forgetfulness. Studies including those in Ghana, Nigeria, and China have associated older age with increasing medication adherence among hypertensive patients (Lo et al., 2016; Boima et al., 2015; Laryea. 2013; Lee et al., 2013; Ramli, Ahmad, & Paraidathathu, 2012). The notion that older age groups are better adherents to treatment have been highly debated. Studies that report higher adherence among the elderly of at least 60 years observe that the group show more concern and are more cautious about their health needs (Lo et al., Lee et al.). Other researchers posit that older people are generally associated with multiple illnesses and would like to adhere to medication compared to patients below 60 years (Lee et al.).

Other studies have reported higher adherence among patients below 60 years, and that older patients are less adherent (Balbay, Annakkaya, Arbak, Bilgn & Erbas, 2005). For example, younger ages have been associated with lower medication adherence among Palestinian hypertension patients (Al-Ramahi, 2014). Stratifying the levels of adherence by age group is appropriate when designing interventions to improve medication adherence. Understanding which age group is associated with low adherence to therapy provides clues to tailor interventions to address age specific adherence needs. However, there have not been conclusions on the issue of age and level of medication adherence.

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There are conflicting findings regarding sex and medication adherence in hypertensive patients. To some studies, females are more likely to be adherent than men (Ramli et al., 2012; Ambaw, Alemie, Yohannes, & Mengesha, 2012; Balbay et al., 2005; Ross et al., 2004). Some of the reports attribute the difference to the busy outdoor activities that frequently engage men's attention, and the probable high levels of alcohol consumption among men (Ambaw et al., 2012). However, researchers including Holt et al. have found no significant difference in adherence between men and women (Holt et al., 2013; Okoro & Ngong, 2012). Contrary, a study in Taiwan has indicated that male patients adhere more effectively to anti-hypertensive medication than female patients, explaining that male patients were more concerned about the possible consequence of hypertension (Chen, Lee, Liang, & Liao, 2014).

The controversy surrounding sex differences in adherence may be affected by methodology, target populations, and designs. Some of the surveys include participants of at least 18 years; others study older adult participants of at least 65 years (Holt et al., 2013; Ambaw et al., 2012). The differences in target groups might have influences on the results in some of the studies. In spite of the limitations, the debate underscores the need to assess possible reasons for sex differences in medication adherence, in order to design specific interventions for the at risk sex group.

Married partners are expected to adhere to medication compared to those who stay single, in view of the support a spouse may offer the partner. Studies have shown that spousal assistance through reminders promote adherence to medication (Wu et al., 2012; Okoro & Ngong, 2012; Jin et al., 2008; Trivedi, Ayotte, Edelman & Bosworth 2008; DiMatteo, 2004). According to Okoro &

Ngong, partners in the Borno State of Nigeria show higher adherence because of the support they receive from one another. Wu et al. also observed that unmarried patients are less likely to be adherent to medication compared to couples, citing factors such as direct practical support and supervision of medication administration that unmarried patients may lack. However, a study in Ghana has reported low adherence among married partners, citing the effect of competing needs of the married women in respect of home duties and professional work (Laryea, 2013). The debate suggests the need to identify factors that could enhance adherence among both the married and the unmarried patients.

The assumption that patients with high levels of education are likely to be healthier or to be good adherents is debatable (Grossman, 2008). For example, a study among college students in the United States found no evidence to support the notion that increased levels of education improves health outcomes (Altindag et al., 2011). While some studies have reported lower levels of medication adherence in patients with higher educational statuses (Boima et al., 2015; Harries et al., 2005), others have associated increased educational status with increased medication adherence (Menditto et al., 2015; Bello & Itiola, 2010; Ikechuwku et al., 2010). These studies suggest that the higher the level of education, the better the patients' understanding of medication. However, Harries et al. (2005) attribute the negative association of formal education with low medication adherence in Ghana to possible exposure to false beliefs about hypertensive medication, and the scepticism among educated participants regarding anti-hypertension medicines.

In other studies, researchers including Okoro & Ngong (2012) have not found significant association between level of education and adherence to medication. Braverman & Dedier (2009) on the other hand, associates lower educational attainment below high school with higher medication adherence among men, and lower adherence among women, though education was relatively higher among women than men of urban African Americans. The explanation is that women with low level of education are more likely to be preoccupied with child care than those with higher education. The discussions suggest a lack of clear differences between educational status and the level of hypertensive medication adherence. This therefore underscore the need for further insights.

Adherence has been shown to correlate with lifestyle modifications, and that patients who do not take medication are less likely to change lifestyle (Holt, et al., 2013). Practising fewer lifestyle changes for blood pressure control have been associated with low adherence to medication (Holt, et al., 2013). Other studies have further shown that negative lifestyle such as higher body mass index (BMI) and alcohol misuse are associated with risk of non-adherence to anti-hypertensive and insulin injections (Cené et al., 2013; Grodensky, Golin, Ochtera, Turner., 2012; Bryson et al., 2008). Though the level of alcohol which could adversely affect medication adherence is debatable, there is a general acceptance that alcohol misuse is associated with lower medication adherence rates. The probable explanations are that sometimes, patients forget their medications due to intoxication. Yet others deliberately avoid the medicines for fear of adverse reactions with alcohol. With respect to tobacco use, adherence rates among non-smokers have been found significantly higher than that of

smokers (Menditto et al., 2015; Balbay et al., 2005). The debate about the effect of lifestyle changes on medication adherence informs the need to assess the impact of lifestyle among patients in Cape Coast.

Forgetfulness is a patient factor, which is cited as cause of non-adherence, especially among elderly hypertensive patients (WHO, 2003). It occurs in various ways; these include forgetting to take medication or forgetting the instructions given by the health provider. Forgetfulness has been identified as barrier to medication adherence, with significant association with low levels of adherence (Al-Ramahi 2014; Jin et al., 2008; Harries et al., 2005). It is a major issue that requires further assessment to determine its level among patients in the study area. The finding will suggest possible interventions, including the type of reminder system to support patients.

Socio-economic factors and adherence

Various socio-economic factors such as income, time, employment, social support, and cost of medicines have been associated with medication adherence. For example, patients may fail to commit to time of medication because of busy schedules and travels, and this may affect adherence (Jin et al., 2008). In a qualitative study to explore the factors of adherence among 40 hypertensive participants in Nigeria, patients complained about the lack of time for extra curricula activities such as exercise (Odusola et al., 2014).

Cost of medication may affect adherence for patients on long-term treatment regimen such as hypertension, especially in countries where insurance schemes are non-existing. According to Buabeng et al. (2004), unaffordable prices of medicines was the main cause of non-adherence at the time when health insurance had not been introduced in Ghana. Unaffordable cost of

medicines may lead to skipping of medication (Holt et al., 2013) since patients would only take drugs as and when they could obtain them. Low social economic status or low income earners and the unemployed have been associated with low medication adherence due to competing family needs for the little income (Rolnick, Pawloski, Hedblom, Asche, Bruzek, 2013; Lee et al., 2013).

Cost may not be a key issue in countries including Ghana now where patients are provided free anti-hypertensive medicines through the National Health Insurance Scheme. Studies have shown that patients with access to insurance are more likely to be adherent to medication compared to patients without insurance, because care is affordable with insurance (Odusola et al., 2014; Jin et al. 2008). However, according to Boima et al. (2015) having access to health insurance does not significantly associate with increased medication adherence in Ghana. Nonetheless, patients with less concern for cost are more likely to be adherent than those who show concern for other competing personal needs (Yue, Bin, Weilin, Aifang, 2015). The issue regarding lower adherence among insured patients in Ghana requires further investigations to identify other possible reasons affecting insured clients.

Social support through financial assistance, reminders to take medicines, assisting the elderly to attend clinics, and helping couples to observe therapy have been shown to improve adherence (Yue et al., 2015; Odusola et al., 2014; Wu et al., 2012; Osamor & Owumi, 2011; DiMatteo, 2004). Family members who show concern for patients' needs provide financial and emotional support. According to Odusola et al, families who opt to eat low salt meals because of a hypertensive relative, support the patient's blood pressure lowering effort. This

study would assess the effect of family support on medication adherence in the Metropolis.

Health systems and adherence

Distance to health centres, waiting time, and poor patient-doctor relationships may adversely affect adherence (Odusola et al., 2014). On the contrary, good patient-doctor relationship and easy accessibility to health facilities may improve adherence to treatment (WHO, 2003). Good communication between patients and prescribers promotes understanding and agreement with respect to medication instructions.

Collaborative communication between health care providers and patients have been associated with increased adherence to anti-hypertensive (Odusola et al., 2014; Schoenthaler et al., 2009; Zolnierek & DiMatteo, 2009). According to Zolnierek & DiMatteo, patients have 19 percent increased risk of non-adherence when doctors communicate poorly with them, compared to patients whose doctors communicate well. Patient dissatisfaction with communication with health providers have also been shown to affect adherence in women more than men. Holt et al. (2013) observed that the differences might have to do with gender and that women might interact poorly with male providers. This argument emphasises the need to assess the Patient-Doctor consultation process in order to determine its effect on gender medication behaviour in Cape Coast Metropolis.

Inadequate time with patients is a threat to the patient's motivation to maintain therapy. Some non-adherent patients feel that less time with the doctor means a lack of concern (Jin et al., 2008), however, trust in the doctor has been shown to improve adherence in patients (Odusola et al., 2014). Other healthcare

related factors such as long waiting hours and inconvenience clinic time affect patients' ability to follow-up for medication. For example, clinics operating on Friday may affect patients who are Muslim. Younger patients may be affected by work and other commitments when clinic hours are long (Odusola et al.; Jin et al.). Therefore, adherence may improve with flexible clinic days and hours and with sufficient time with patients. The effects of healthcare related factors on medication adherence need to be assessed in the current study area because of the negative impact on medication adherence.

Therapy related factors and adherence

Adverse effects of medicine, duration of medication, complex prescriptions, frequent changes in treatment, taking multiple drugs, and negative lifestyle practices affect patient adherence behaviour (Jin et al., 2008). Large quantities of medicines per prescription have been associated with low adherence behaviour. Patients on multiple drugs express the fear of getting addicted to medicines (Al-Ramahi 2014; Ramli et al., 2012; Klootwyk & Sanoski, 2011). However, other studies have shown that increasing the number of medicines has resulted in increased adherence (Laryea, 2013; Okoro & Ngong 2012; Hashmi et al.). According to Hashmi et al. (2007), patients on multi therapy, compared to those on single dose therapy, may feel threatened by the severity of the condition and are more likely to observe treatment. Besides, patients on multiple prescription are less likely to forget their medication.

Adverse drug effects contribute significantly to poor adherence, notably when the patient is not aware of the possible side effects. Various studies have shown that patient perceived adverse effects of medication reduce adherence (Boima et al., 2015; Rajpura & Nayak, 2014; AL-Ramahi, 2014; Ogah &

Rayner, 2014; Odusola 2014; Sweileh et al., 2014; Ikechuwku et al., 2010). Low sexual functioning among men have been associated with medication side effects. When men perceive that their medication is the cause of their low sexual drives, they are likely to stop medication (Holt et al., 2013; Agyemang et al., 2012b).

Long treatment duration has been associated with high medication adherence. Studies have shown that patients with at least ten years use of anti-hypertensive remain adherent (Yue et al., 2015; Lee et al., 2013). The explanation is that patients on long term medication may get used to the medicines and are therefore more experienced in managing their medication schedules. On the other hand, longer duration with hypertension after diagnosis has been associated with poor medication adherence (Han, Hong & Tiraphat 2015; Li, Kuo, Hwang & Hsu, 2012). Li et al.) observed that patients might become used to the symptomless nature of hypertension and therefore find no need for efforts to adhere to the medication.

Ignorance about the routine use of anti-hypertensive medication, which is the result of poor understanding of treatment instructions, negatively affects adherence. Patients with poor knowledge about the management of hypertension may stop medication when they no more experience perceived symptoms (Odusola et al., 2014; Alsolami, Hou, & Correa-Velez , 2012). Other therapy related issues that are likely to result in poor medication adherence include combination of herbal with anti-hypertensive (Odusola et al., 2014) and complicated medication regimen or increased frequency of dosage (Ramli et al., 2012; Lam, Lum, & Leung, 2007). These issues should be researched in the Cape Coast Metropolis, for proper interventions to improve adherence.

Disease-related factors and adherence

Disease-related factors which may affect medication adherence include unusual symptoms, disease severity, chronicity or duration, hereditary, presence of comorbidity, and difficulty understanding the nature of the disease. According to the World Health Organisation, patients suffering from diseases which require long-term treatment duration such as hypertension, diabetes, and asthma stand higher risks of non-adherence to medication (WHO, 2003). Other studies have found increased adherence among patients with at least ten years of medication explaining that patients may become used to medication the longer they live with the condition. Furthermore, they acquire skills that enhance adherence (Yue et al., 2015; Lee et al., 2013).

Studies have shown that sufficient knowledge about hypertension and diabetes significantly improves medication adherence (Jankowska-Polańska, Uchmanowicz, Dudek, & Mazur, 2016; Sweileh et al., 2014; Ahmad, Ramli, Islahudin, & Paraidathathu, 2013; Ambaw et al., 2012: Ramli et al., 2012). However, poor knowledge about the risks of complications of hypertension as well as its severity decreases adherence (Nsitou, Ikama, Drame, & Kaboru, 2013). In one study, average knowledge of hypertension is reported to be associated with non-adherence (Saleem, Hassali, Shafie, Awad & Bashir, 2011).

Multiple diseases, including diabetes and asthma often occur with hypertension in Ghana. A hospital-based survey found multiple diseases in about 38 percent of participants with hypertension and 36 percent in diabetes cases (Nimako, Baiden, Sackey & Binka, 2013). The presence of other diseases in hypertensive patients have been associated with increased medication adherence (Rolnick et al., 2012; Ambaw et al., 2012).

Hypertension, in particular, shows no symptoms and may adversely affect adherence since patients who feel better may discontinue medication. Subsequently, patients may not be motivated to adhere to treatment in case of such a symptomless condition (Ross et al., 2004; Jin et al., 2008). The misconceptions about appearance of symptoms is a notable cause of non-adherence in patients with hypertension (Ross et al.). The study would assess the hypothesis that patients' perception of the condition affects adherence.

Hypertension Policy in Ghana

The aim of the United Nation's (UN) policy on hypertension is to reduce the prevalence of high blood pressure by 25%, and dietary sodium by 30% by the year 2025. One major achievement of the WHO and the World Hypertension League (WHL) is the designation of May 17 each year as world hypertension day to raise awareness. The two bodies have further developed guidelines upon which member countries are to integrate into their respective health delivery systems to detect, control and prevent hypertension (Campbell, Niebylski, and World Hypertension Executive, 2014; WHO, 2013). Furthermore, the United Nations together with national associations are to advocate the development of public policies towards dietary salt reduction, restrictions on unhealthy foods, control of tobacco and alcohol consumption.

Among the sub-Saharan African countries, only South Africa is known to have implemented a national policy on dietary salt reduction (Campbell et al 2014). Ghana does not have a policy for the prevention, and control of hypertension specifically, however, there is a policy framework on non-communicable diseases which includes hypertension, diabetes, asthma, sickle cell and cancer (Ministry of Health, 2012; Bosu, 2012). Furthermore, Ghana has

a written national policy on alcohol which advocates increase in alcohol tax and restriction on alcohol advertisement. But there is no legally binding regulation on alcohol advertisement, or sponsorship, and no legally required health warning on all containers, except the implementation of exercise tax on beer, wine and spirits (WHO, 2014b). The Ghana Health Services is mandated to implement specific policy objectives on prevention and control of non-communicable diseases. Few hospitals including Korle-Bu and a number of the Regional hospitals run clinics for diabetes with hypertension as the secondary condition. However, some of the clinics are not very effective because they lack the critical staff (GHS, 2011).

Discussion

The review examined the impact of hypertension on global economies, the influences of patient perceptions and beliefs on medication adherence, and the factors affecting adherence to therapies. There are issues and gaps with patients' medication behaviour in the literature which this study attempts to provide additional explanations. The revelations in the literature include issues regarding the relationships between socio-demographic characteristics, biometric factors, health care related factors and medication adherence. Specific gaps relate to age, sex, marital status, education, cost, and medication adherence. There are also issues about patients' lifestyle, forgetfulness about medicines, the doctor-patient consultation process, duration of hypertension, and perceptions of hypertension.

The notion that older patients of at least 60 years are better adherents to treatment has not been concluded (Lo et al., 2016; Boima et al., 2015; Laryea. 2013; Lee et al., 2013; Balbay et al., 2005). There have been debates about the

issue of age and level of medication adherence. Understanding which age groups associate with low adherence to therapy provides clues to tailor interventions to address age specific adherence behaviour in the Metropolis.

The matter about which sex group among hypertensive patients is more likely to be adherent also remains inconclusive (Ramli et al., 2012; Holt et al., 2013; Okoro & Ngong, 2012). The debate underscores the need to assess the possible reasons for sex differences in medication adherence, in order to design specific interventions for the at risk sex group in the Metropolis.

The reports that married partners in Ghana are less likely to adhere to anti-hypertensive medicines (Laryea, 2013) suggest the need to identify the possible factors that contribute to non-adherence among couples. It also suggests the need to identify the factors that could enhance adherence among the unmarried patients.

There are conflicting views regarding educational status and improvement in health outcomes (Altindag et al., 2011; Grossman, 2008). The review suggests a lack of clear differences between educational status and the level of hypertensive medication adherence among patients (Okoro & Ngong, 2012; Bello & Itiola, 2010; Ikechuwku et al., 2010). Associating low medication adherence among patients with higher education in Ghana (Boima et al., 2015; Harries et al. 2005) requires further insights in this study.

The relationships between medication adherence and cost of medicines is a matter for further research in Ghana due to the existing insurance policy (Buabeng et al., 2004; Holt et al., 2013). Access to insurance is said to associate with high levels of adherence to medication (Odusola et al, 2014; Jin et al., 2008). However, the observation by Boima et al. (2015) that availability of

health insurance did not improve medication adherence in Ghana, where there is free anti-hypertensive supply to patients, through the national health insurance scheme, require further insights.

There are assertions in the literature that negative lifestyle practices such as alcohol misuse, tobacco use, physical inactivity, and overweight may lead to low medication adherence among patients (Menditto et al., 2015; Cené et al., 2013; Bryson et al., 2008). However, the extent to which lifestyles affect medication adherence among hypertensive patients is debatable. This informs the need to assess the impact of patients' lifestyle on medication adherence in the Cape Coast Metropolis.

"Forgetting sometimes" to take medication is reported to have significant association with low levels of adherence (Al-Ramahi 2014; Jin et al., 2008). The behaviour is a major issue among hypertensive patients in Ghana (Harries et al., 2005). This issue requires further interrogation to determine the extent of forgetfulness among patients in the study area. While poor communication affects adherence, collaborative communication between doctors and patients is said to associate with increased adherence to medication (Odusola et al., 2014; Schoenthaler et al., 2009). There were different views in the literature regarding which consultation approach (compliance, adherence, and concordance) facilitates medication adherence (Aronson, 2007; Cushing et al., 2007; Horne et al., 2005; Weiss & Britten, 2003; WHO, 2003). This study attempts to assess the consultation processes and its effect on medication adherence in the Metropolis.

Long duration of hypertension after diagnosis has been associated with poor medication adherence (Han et al., 2015; Li et al., 2012). Studies report that

hypertensive patients may become used to the symptomless nature of the condition as well as the medicines, and therefore find no need to make efforts to adhere (Yue et al. 2015; Li et al.). However, when patients are aware of the chronic nature of hypertension, they are more likely to endure treatment for a longer time according to Leventhal et al. (1997). This study assesses the effects of living with hypertension for a long period of time on medication adherence in the Metropolis.

Findings in literature about patients' perceptions regarding the causes, timelines, and treatment control of hypertension are not consistent (Petrie & Weinman, 2012). Studies suggest that beliefs in appearance of symptoms, curability, and the cyclical nature of hypertension may lead to non-adherence among patients (Petrie & Weinman, Chen et al., 2009; Halm et al., 2006; Ross et al., 2004). Thus, relationships between perceptions of hypertension and medication adherence are debatable (Petrie & Weinman, 2006; Ross et al.). This study would assess the hypothesis that patients' perceptions of hypertension affect medication adherence. In addition to the gaps in the literature, the study would attempt to identify other possible influences of medication adherence in the Cape Coast Metropolis. Chapter Three discusses the theoretical foundation for the study.

CHAPTER THREE

THEORETICAL PERSPECTIVES AND CONCEPTUAL FRAMEWORK

Introduction

The chapter provides literature on various theories to explain patient medication and health behaviour. It discusses selected health behaviour models and explains their constructs, application, strengths, and weaknesses. Finally, the chapter discusses issues regarding the choice of model, its limitations and suitability for the study.

Models of Health Behaviour

The individual's health behaviour refers to the actions taken by the person to maintain, retain, or regain good health. Various models have been developed to explain health behaviour change in preventive and curative care. These are grouped as the Biomedical, Communication, Behavioural, and Cognitive models (Munro, Lewin, Swart & Volmink, 2007; WHO, 2003). Frequently used models in health behaviour studies are the Health Belief Model (HBM), the Social Cognitive Theory, the Theory of Planned Behaviour, and the Self-Regulatory Model.

The Health Belief Model

The Health Belief Model was originally introduced by Rosenstock in 1966 to predict preventive health behaviours such as immunisation as well as patient response to acute and chronic illnesses (Ogden, 2004). The assumption underlying the model is that people fear diseases and will take recommended health actions to avoid illnesses, depending, on the degree of fear.

According to the Health Belief Model, readiness to take a prescribed health action is subject to specific constructs which are perceived susceptibility, perceived severity, perceived benefits and barriers. Additional constructs are self-efficacy and "cues to action". Included in the model are the demographic, social and psychological actors which affect individual's perception about the disease (Ogden, 2004).

The core principle underlying the health belief model is perceived threat which is determined by the concept of perceived susceptibility and seriousness. According to the proponents, people will be moved to take a health action to prevent a disease when they believe they are equally vulnerable or susceptible and see the condition as a serious one. The extent of the threat determines the person's readiness to take recommended health action (Morris, Marzano, Dandy & O'Brien, 2012; Munro et al., 2007; Taylor et al., 2007).

The concept of perceived benefits and barriers imply that people will be motivated to take recommended health actions where they perceive that the benefits of complying with the action outweigh the cost involved in taking the action. Therefore, people are likely to comply with a recommended treatment if they believe such an action will reduce the risk of the disease, in spite of the practical and psychological barriers of the action (Munro et al., 2007; Ogden, 2004).

Furthermore, the concept of cues to action refers to one's readiness to take an action against a perceived threat of the disease, depending on one's perceived confidence in oneself to carry out such an action. Readiness to take health action is affected by socio-demographic and psychological factors. People are influenced to accept a health action by internal factors such as the

symptoms of the disease and by external factors such as economic and media campaigns about the effects of the condition.

The Health Belief Model has been criticised for being a fear induced model because of its emphasis on the concepts of susceptibility and seriousness (Taylor et al., 2007). For example, people may be afraid when they are told about the dangers of their illnesses. Subsequently, the model may be associated with the paternalistic concept of compliance which emphasises threat to action as against the concept of adherence which emphasises mutual agreement and willingness to act. In spite of the criticism, the Model was applied in tuberculosis screening exercise using x-ray, where an association between belief in the benefit of treatment and x-ray acceptance was found (Taylor et al.).

The Social Cognitive Theory

The Social Cognitive Theory (SCT) was proposed by Bandura in 1986 as an extension of the Social Learning Theory. The main purpose of the theory is to promote effective self-management of habits to keep people healthy (Bandura, 2004). It also provides a framework for understanding why and how people may change their health behaviour (Glanz, Rimer & Viswanath, 2008). It is identified by a set of core constructs which broadly are, knowledge of health risks, perceived self-efficacy, outcome expectations, the health goals, the perceived facilitators and impediments as well as personal motivation (Bandura).

Knowledge of health risk and benefits provides a condition for people to decide to change behaviour. For example, if people do not know about the effects of the negative habit, they may not see the need to embark on the change process. Outcomes are the cost or benefits to consider when changing health

habits. Outcome expectations refer to beliefs about the expected result after performing the action needed to change behaviour. These beliefs could result in positive or negative outcomes (Bandura, 2004, 1997). Self-efficacy beliefs on the other hand, refer to the capacity of the person to influence the events that affect the expected change. It is the ability of the individual to control the health risk or habit.

Incentives are used to facilitate the expected change, while laws or punishments are enacted to prevent undesirable actions such as stopping tobacco use or misuse of alcohol. According to the model, health behaviour change can also be influenced by personal goals. Goals provide incentives to take actions to change habit. Additionally, perceived facilitators and obstacles or impediments may affect behaviour change efforts. For example, barriers in the form of pressure from work, depressed mood, and anxiety may affect desired change. However, where there are no additional challenges, change becomes easier (Bandura, 2004).

The central theme of the theory is the concept of self-efficacy. The individual must possess self-efficacy as well as the motivation to act. The greater the efficacious beliefs, the higher the goals people set for themselves. Self-efficacy shapes expected outcomes. Therefore, the higher the self-efficacy beliefs, the higher the outcome expectations. People with lower self-efficacy beliefs, easily give up efforts to change behaviour (Ozmete & Hira, 2011).

The Social Cognitive Theory has been applied in interventions to improve health. A case is an intervention in Texas by the American Cancer Society, which offered counselling through telephone services to help people quit smoking (McAlister, 2004). It was also applied in interventions to improve

sexually transmitted infections with condom use. The study sought to investigate the influences of the cognitive theory constructs on condom use during sexual intercourse. The sexual self-efficacy construct, self-control-self-efficacy, self-efficacy with partner, and partner expected outcomes significantly related to condom use at last sex (Snead, O'Leary & Mandel, 2014). The self-efficacy construct significantly predicted safer sex behaviours among African-Americans college students (Kanekar & Sharma, 2009).

The Cognitive Theory has also been applied in hypertension medication adherence studies. Perceived personal control has been shown to improve adherence to anti-hypertension medication (Chen et al., 2009; Ross et al., 2004). In spite of these evidences, one main criticism of the cognitive theory is scope. It is said to be very broad and attempts to provide explanations for every human behaviour, thus making it difficult to apply (Munro et al., 2007).

The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) was formulated in the 1980s by Icek Ajzen to understand how individual behaviour can be influenced to induce change. It succeeded the Theory of Reasoned Action (TRA) formulated in the 1960s by Ajzen and Fishbein (Ajzen, 1991). The original theory of reasoned action combined two main constructs, which were the behavioural attitudes and the subjective norms (Taylor et al., 2007; Munro et al., 2007). It assumed that behaviour is voluntary and under the control of the individual. Therefore, individuals choose to behave the way they do because people make rational decisions and plans about their actions. However, it was criticised for being limited in scope because behaviour cannot be 100 percent voluntary or under control. It was modified into the Theory of Planned Behaviour with the

addition of the concept of perceived behavioural control, which refers to perceived ability of the individual to perform the behaviour (Ozmete & Hira, 2011; Ajzen, 1991).

The fundamental assumptions of the Theory of Planned Behaviour are summed in three beliefs, namely behavioural beliefs, normative beliefs, and control beliefs. Behavioural beliefs refer to the possible outcome of the behaviour, which could be positive or negative, favourable or unfavourable. Normative beliefs are the behaviours that other persons expect to see of the individual (Taylor et al., 2007). The third construct is the control beliefs, which are the presence of external factors that may affect performance. They represent the perceived ease or difficulty with which the person may perform the action (Morris et al., 2012; Munro et al., 2007; Taylor et al.; Ajzen, 1991).

Attitude towards behaviour, the subjective norms, and behavioural controls lead to behavioural intention, which is an indication of the person's readiness to perform the action. Behavioural intention is determined by the strength of the three behavioural beliefs; that is, attitude beliefs, normative beliefs, and control beliefs. Therefore, the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger the persons intention to perform the action (Ajzen, 1991). The theory has been criticised for not including emotional response among the constructs as is found in the Health Belief Model of illness. Furthermore, it fails to recognise environmental factors that may influence behaviour. The behavioural control component is said to be similar to the concept of self-efficacy in other models such as the Health Belief and Self-regulatory models (Taylor et al., 2007).

The Theory of Planned Behaviour has been applied in interventions to change behaviour of people as well as predict how people may behave towards an intervention. It has been effective at promoting behaviour change in disease control, safe sex, and condom use. For example, Ye, Krupka and Davidson (2012) applied the model to guide the assessment of non-adherence in myocardial patients. It was found useful in understanding why a patient failed to adhere to treatment, and helped to promote adherence in the myocardial patient. Claude (2011) applied the model to predict intention to adhere to diabetes treatment.

The Self-Regulatory Model

The Self-Regulatory Model (SRM) was originally described as the Common Sense Model of illness representation and was proposed by Leventhal in the 1950s (Browning, Wewers, Ferketich, Otterson & Reynolds, 2009; Ogden, 2004). The model provides a framework for understanding how experiences and perceptions of an illness affect coping or adherence to treatment. When patients are diagnosed of an illness, they search to understand what the illness means, its causes, consequences, how long it would last, and whether it can be cured or controlled. Information about the disease is usually obtained from their personal experiences, family, friends, media, and health professionals (Browning et al., 2009; Ogden). Patient beliefs about an illness may be at variance with the medical interpretation of the disease. However, their perceptions are expected to influence their actions to induce the expected behaviour change.

The model anchors on seven main constructs, namely identity, cause, timeline cyclical or acute, cure or controllability, consequences, coherence, and

emotional response. Identity refers to beliefs about the label or symptoms of the illness. Cause refers to beliefs about the causal factors that are associated with the illness. Timelines beliefs refer to whether the illness is acute or chronic that is, whether the illness can be cured in a short time or longer period of time. Consequence refers to the risks associated with the illness or the possible dangers of the illness. Curability or controllability beliefs are whether the illness is curable or could be personally controlled, while illness coherence refers to meaning, understanding or the overall picture of the illness. Emotional response refers to the emotional impact of the diagnosis to the patient (Earlise. Clark & Heidrich, 2009; Harvey & Lawson, 2008; Ogden, 2004).

The model takes account of patients' present and past experiences as well as their emotions, and considers the patient as an active player in the management of the ill-health or the behavioural change process. The principle underlying the model is that patients can be influenced to understand their condition in order to induce action (Harvey & Lawson, 2008). It has been applied in various health behaviour studies, including hypertension, HIV, and diabetes medication adherence (Lee et al., 2013; Browning et al., 2009; Ross et al., 2004), and has been found to be useful.

Conceptual Framework of the Self-Regulatory Model

The Self-Regulatory Framework has three stages, which are the cognitive representation of illness or interpretation of illness, the action plan or coping stage, and the appraisal stage. The first stage assesses the patient's cognition, knowledge or understanding of the condition; stage two assesses how the patient is coping with the treatment, and finally, the third stage evaluates the patient for possible modifications to improve outcomes (Harvey & Lawson,

2008). Besides, there are socio-demographic and psychological factors that are known to influence health behaviour as shown in Figure 1. These include an assessment of the socio-demographic, economic, education, and cultural beliefs.

Patients receive information about their illnesses from sources including the hospital, family members, friends, and media adverts. When the patient receives information about the diagnosis, which are the identity, cause, consequences, timelines, and the appropriate management procedure, the emotional response to the information is expected to influence treatment adherence (Figure 1). The emotional change, upon receiving information about the nature of the health threat, leads to decisions as to whether to cope or not with the recommended therapy.

In stage 1 (Figure 1), interpretation focuses on explaining the health threat or condition to the patient. At this stage, the patient is expected to understand the nature of the health threat or obtain a clear picture of the health problem. It explains how the illness presents itself and addresses the patient's perceptions and emotions about the illness (Ogden, 2004; Diefenbach & Leventhal, 1996).

According to the Self-Regulatory Model, once the person receives information about the illness, he or she is motivated to take action to treat it (Ogden, 2004). Therefore, the interpretation stage is the phase that presents the medical knowledge about the condition; it juxtaposes the assessment of the patient's own layman's beliefs about the illness and its management. It is also the stage of emotional response where the patient takes a decision to adhere or not to treatment.

The second phase of the model focuses on adherence to the treatment plan. When the diagnosis is made and the appropriate treatment plan is recommended, the patient's acquired knowledge and understanding of the condition may influence his capacity to adhere to treatment (Browning et al., 2009). Coping stage or adherence is the stage where the patient takes steps to control high blood pressure. Adherence may take various forms such as following medication course as well as lifestyle or a habit change programme.

The third stage of the model is the outcome appraisal where the patient is appraised using outcome variables such as adherence, blood pressure levels and quality of life indicators (Figure 1). The individual evaluates the effectiveness of the coping strategy and decides whether to continue with the approach or opt for an alternative treatment. The health personnel, on the other hand, assesses how successful adherence has been. If adherence is ineffective, the health expert may recommend alternative treatment plans (Ogden, 2004). Where adherence is positive, the patient is expected to continue with the process until the outcome is acceptable. In this case blood pressure is expected to remain below 140/90 mmHg, if adherence is effective.

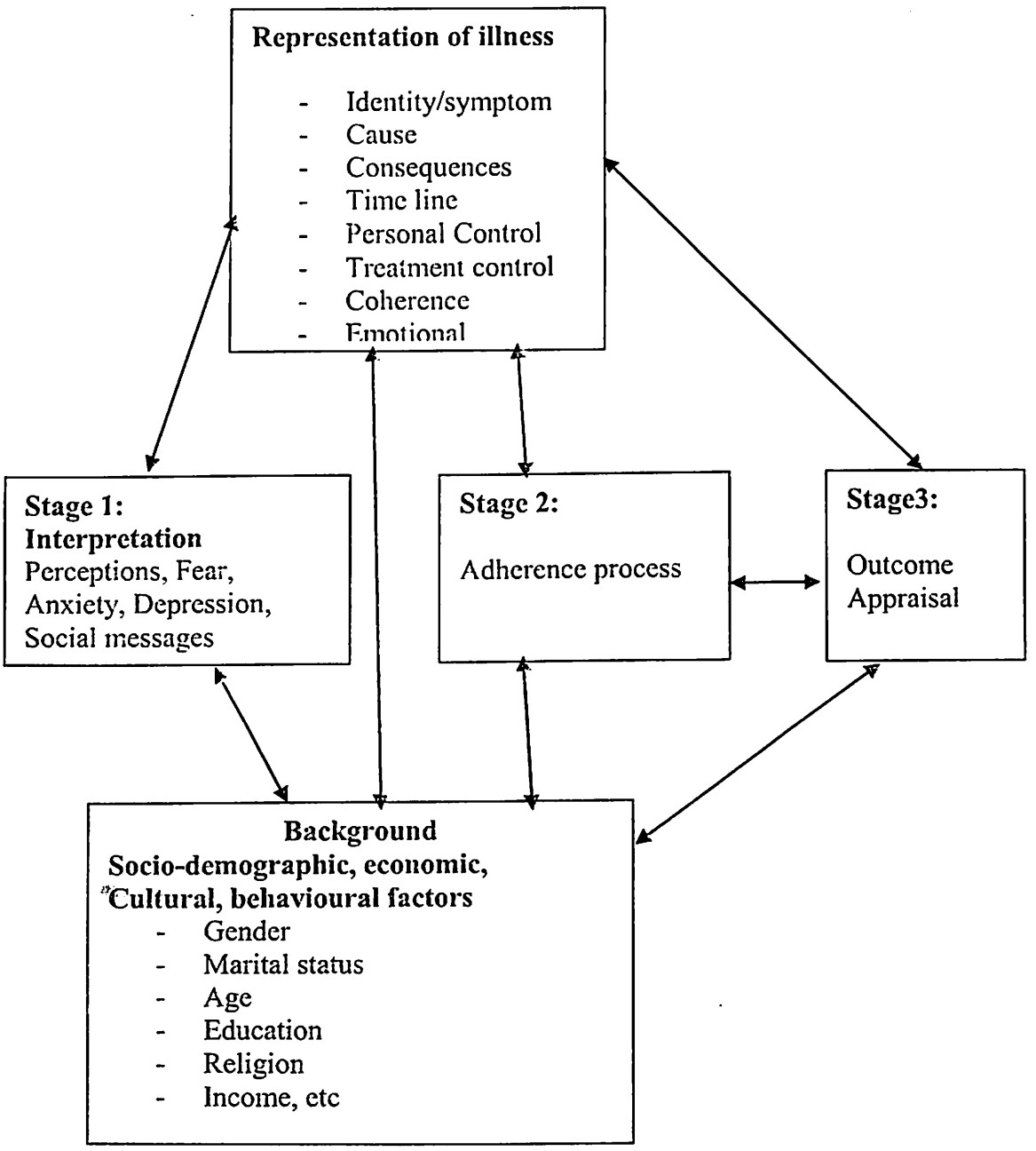

Figure 1: Leventhal's Self-Regulatory Model of Illness Behavior adopted

Source: Browning et al. (2009); Ogden (2004)

The model is said to be dynamic, cyclical or continuous because information received from each stage is fed into the other (Browning et al., 2009). For instance, the result of the outcome appraisal reflects the effectiveness or otherwise of the adherence process (Figure 1). The outcome also gives a picture of the level of understanding or illness coherence of the patient. It tells whether the patient's illness coherence or his/her understanding of the nature of

the disease is positive. It also tells whether the patient is emotionally ready to maintain adherence to the treatment plan. If the patient is not adhering to treatment, then it could be intentional or unintentional. This knowledge will provide suggestions for the necessary interventions to address adherence.

Socio-demographic and behavioural characteristics specific to individuals are known to influence health behaviour (Figure 1). Age, income and education are known demographic factors that could influence the patient's adherence behaviour (Browning et al., 2009). For instance, old age can negatively influence the patient's memory and ability to adhere to prescription, thereby affecting treatment outcomes (Jin et al., 2008; WHO 2003). Furthermore, one's understanding of the nature of the condition could depend on one's level of education, sex, income, and age.

Behavioural characteristics such as addiction, peer pressure, perceptions may affect the adherence process as well as health outcomes. For example, it could be very difficult for persons who are highly addicted to alcohol to immediately discontinue alcohol use because addiction requires repeated interventions and a gradual control process to be successful. Furthermore, when acquaintances such as friends who provide social support also indulge in same habit such as smoking, it becomes difficult for them to support the patients' effort to quit smoking (Okoro & Ngong, 2012; Browning et al., 2009). The characteristics of the individual self thus reflects in all three stages of the self-regulatory model. For example, the level of addiction to alcohol or tobacco use and the extent of social support available may influence illness representation, the adherence process, and the outcome (see Figure 1).

The Self-Regulatory Model was used in this study to explore patients' perceptions, adhering abilities, and treatment outcomes among the sample of patients continuing with treatment. Stage 1 or the illness interpretation phase was assessed using the revised illness perception questionnaire for hypertension (Moss-Morris et al., 2002). It assessed how patients' perceptions and beliefs of hypertension regarding the causes, symptom/identity, and treatment differed from medical explanations. The assessment provides information about the effectiveness of health education, in this case, patients' knowledge about high blood pressure. Stage 2 was assessed using the Morisky Medication Adherence Scale (Morisky, Alfonso. Krousel-Wood & Ward, 2008). The scale was used to measure the levels of adherence of individual patients as well as the overall measure of adherence of the sample.

Stage 3 of the model evaluates the effectiveness of adherence and blood pressure control using patient anthropometric measurements. Patients' blood pressure values were measured using the validated blood pressure apparatuses. The stage reflects effectiveness of medication adherence among the patients.

Discussion

The chapter discussed selected health behaviour models with application in medication adherence. The constructs, strengths, and weaknesses of the Theory of Planned Behaviour, the Social Cognitive Model, the Health Belief Model and the Self-Regulatory Model have been explained. Among the four models, the Self-Regulatory Framework has been found to be appropriate for this study and for the following reasons:

The Theory of Planned Behaviour excludes emotional factors such as threat, fear, and anxiety because it assumes human behaviour is rational (Ajzen,

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The Theory of Planned Behaviour excludes emotional factors such as threat, fear, and anxiety because it assumes human behaviour is rational (Ajzen,

2006). However, individual actions are not always based on rational thinking. In contrast to chronic illnesses such as hypertension, patients are known to show emotions about the long-term nature of the condition. They are anxious about having to take medication for the rest of their lives, and are fearful of adverse drug effects. The exclusion of psychological factors such as fear, emotions, anxiety, and perceptions (Taylor et al., 2007) limits application of the model in this study

The Social Cognitive Theory promotes beliefs in the concept of self-efficacy or belief in personal motivation to effect change (Bandura, 2004). In this context the patient assesses the cost and benefits for adhering to treatment, his self-efficacy or ability to adhere, as well as his motivation to adhere to the expected change. The strength of the Social Cognitive Theory is that some of its principles are able to predict behaviour, provide information, and guidance, to change behaviour (Bandura). However, in view of its broad focus, its application in this study may be limited.

The Health Belief Model weighs perceived susceptibility as well as the seriousness of the illness against the benefits of the action, and that patients might adhere to treatment if they hold strong beliefs about the negative effects of the threat (Munro et al., 2007; Ross et al., 2004). The model fails to account for emotional factors in health behaviour (Odgen, 2004). Furthermore, the management of hypertension requires dynamic processes of adhering, appraising outcome, and giving feedback, which are not found in the health belief model. The inadequacies of the model at addressing emotions limit its application in this study.

Though the four models are equally reliable theoretical frameworks for health behaviour research, the focus of the Theory of Planned Behaviour, Social Cognitive, and the Health Belief Models is to predict behaviour change. There are few theoretical frameworks such as the Self-Regulatory Model that address maintenance or sustainability of behaviour change as a process (Noar and Zimmerman, 2005). The Self-Regulatory Model provides a process for adapting and coping with the change needed to maintain health in patients with hypertension (Browning et al., 2009). The model assesses the cognitive and emotional responses of patients, captures individual experiences, and provides specific information to health professionals for appropriate interventions.

Furthermore, the complicated nature of hypertension requires a theoretical framework that addresses issues regarding adhering to the complex treatment and providing feedback in a dynamic process. According to the Self-Regulatory Model, when a person is faced with an illness, he gathers knowledge or ideas to respond to the ill health. The information leads the patient to control the threat of illness by accepting to cope with treatment. The patient appraises the outcome of the coping process, and if the result is satisfactory, he is motivated to continue treatment. Where the outcome is unsatisfactory, the patient's perception of the disease and the adherence process are assessed (Browning et al., 2009). Hypertension is a long-term condition which requires patients to adapt and maintain change. However, unlike the Self-Regulatory Model, the other three do not adequately provide feedback to enforce maintenance of the behaviour change. This makes the self-regulatory framework the preferred model for assessing medication adherence. The next chapter discusses the design, data collection and the analysis processes.

CHAPTER FOUR

RESEARCH METHODOLOGY

Introduction

This chapter discusses the scope and design of the research which include profiles of the study institutions, study design, data instruments, procedure for data collection, ethical issues, and actual field work. It provides a description of the data analysis process, which includes data transformation, coding, and the choice of statistical test. It concludes with explanations for the choice of methods and procedures.

Study Area

The study was conducted in three main hospitals in the Cape Coast Metropolis namely, the Cape Coast Teaching Hospital (former Regional Hospital), Cape Coast Metropolitan Hospital, and the University of Cape Coast Hospital (see Figure 2). The three main facilities which provide similar services to clients are located in the central and southern parts of the Cape Coast Metropolis. The rationale for choosing these facilities is the availability of professionals with skills in hypertension management. Secondly, Central Region is among the four top regions in the country with high prevalence of Hypertension (GHS, 2014), and Cape Coast Metropolitan area is noted for the increasing number of outpatient hypertension in the region (Central Regional Health Directorate, 2014).

Cape Coast Metropolis is a coastal area bounded to the south by the Gulf of Guinea (see Figure 2), and shares boundaries with Komenda Edina Eguafo District to the south-west, Twifo-Heman-Lower-Denkyira District to the north-east, and Abura-Asebu-Kwamankese District to the north. The town is located

on latitude 05^0 05'N and on longitude 01^0 15'W, occupying approximately 122 km square of land. It had a population of about 169,894 as of 2010 (Ghana Statistical Service, 2012). The metropolis has an urban south and semi-urban north characteristics. It is principally a fishing community, with farming, trade and commerce, as well as tourism being important activities. Cape Coast is also endowed with educational facilities from basic level to the tertiary level. It has 6 public health facilities at the primary level and one Teaching hospital at the tertiary level, with a mix of health professionals (Cape Coast Metropolitan Assembly, 2014). However, research exploring patient experiences of hypertension in the Metropolis is scanty. Availability of the range of health facilities and levels of care for hypertension broadens the scope of this study.

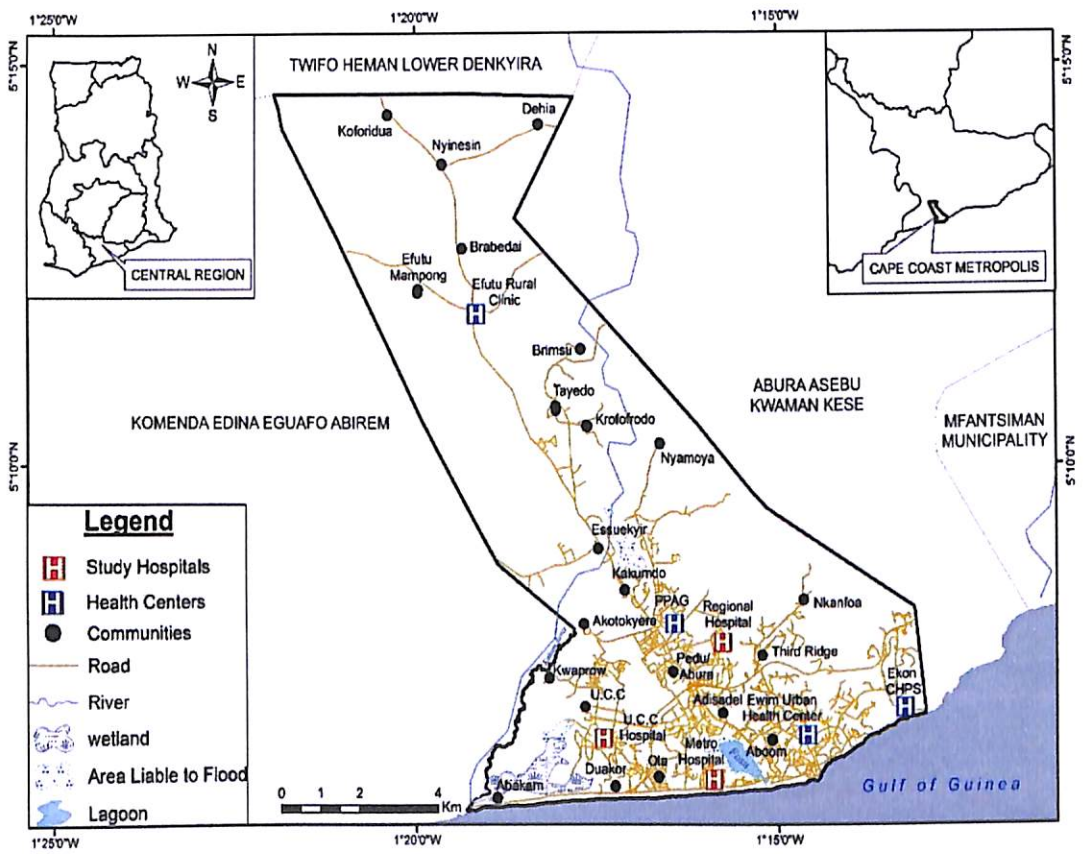

Figure 2: Map of Cape Coast, Showing Location of Study Hospitals

(Source: University of Cape Coast, Department of Geography, 2014)

Profile of the Participating Hospitals

The University of Cape Coast hospital is situated within the campus of the University at Cape Coast. The facility provides primary health care, including curative, preventive, and promotive services to students, staff of the University, and the general public within and outside the surrounding communities. The number of new patients diagnosed for hypertension was 507 in 2013, 659 in 2014, and 1,681 in 2015 (Central Regional Health Directorate, 2015).

The Metropolitan Hospital is situated at Bakano, a suburb of Cape Coast. The health facility provides primary health care including medical, preventive, and promotive services to the public. In 2009, about 3,586 of total recorded outpatient morbidity were hypertensive (see Table 1). The number of cases increased to 5,969 in 2011, and declined to 3,420 in 2013, before it steadily rose to 3,634 cases in 2015 (Regional Health Directorate, Cape Coast, 2015). The sudden decline in the number of reported hypertension patients might have been an issue of non-recording or incompleteness of data.

Table 1: *Trend in New Hypertension Cases in the Three Cape Coast Hospitals, 2009-2015*

Hospital	2009	2010	2011	2012	2013	2014	2015
University Hospital	4,594	4,166	2,953	4,238	507	659	1,681
Cape Coast Metropolitan Hospital	3,586	4,556	5,969	4,020	2,535	3,420	3,634
Cape Coast Teaching Hospital	701	2,361	7,870	13,448	12,840	10,643	10,722

Source: Central Regional Directorate, 2015, Cape Coast

The Cape Coast Teaching Hospital until 2014, was the referral hospital of the Central Region. It was upgraded to a teaching hospital status to provide training for medical students of the University of Cape Coast. The facility provides specialised care and referral services for critical conditions from other health facilities in the region. In addition to its new mandate, it provides general out-patient primary health care to the surrounding communities. It runs a specialised clinic for diabetes, but some hypertension and asthmatic patients receive treatment in the clinic, though the general outpatient department attend to large numbers of hypertensive patients. The number of newly reported cases of hypertension increased each year, from 701 in 2009 to 13,448 cases in 2012. Between 2014 and 2015, cases declined probably due to incompleteness of data (Table 1). The location, and the availability of experts for the management of hypertension made these hospitals unique for the purposes of the study.

Study Design

Using the explanatory approach of the mixed method design, the survey was conducted in two phases: a baseline quantitative survey, and a follow-up qualitative survey (Creswell, 2010) as shown in figure 3. The follow-up study was an in-depth interview of eight purposively selected patients after the baseline study was analysed (Figure 3).

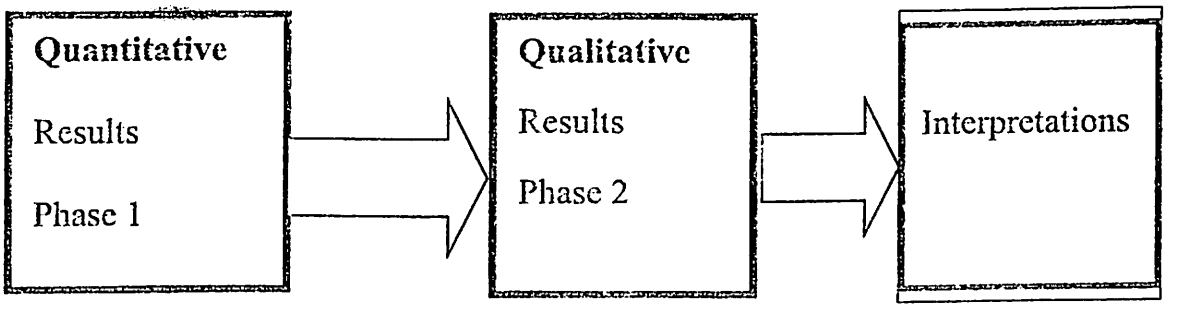

Figure 3: Study Design Approach

Source; Creswell, (2010)

The study relied on the positivist and the interpretivist research ideologies. Based on positivism, quantitative data was collected to assess patient medication adherence and test the hypothesis that age, education and perceptions of hypertension may influence medication adherence. From the interpretivist view point, qualitative data was collected to understand patients' perceptions and experiences with the management of hypertension. The rationale for this approach was to provide further explanations to the results of the quantitative survey in phase one. The combination of the two paradigms of research provided in-depth understanding of patient behavior to treatment.

Target Population

The study targets were patients who had been clinically diagnosed of hypertension, were aware of their condition, received routine medication from the three selected hospitals for at least three months, and were 40 years and above. The exclusion criteria were hypertensive patients younger than 40 years, patients who had had less than three months visits, and pregnancy-induced hypertensive patients. The reasons for the exclusion were that, the age limit was imposed to ensure that persons who were on permanent treatment were selected. The decision was supported by evidence establishing increasing incidence of hypertension among older ages beyond 40 years (Addo et al, 2012; Gupta 2011; Bosu, 2010), and that patients of the older age group 50 years and above have been independently associated with being on permanent drug treatment compared to lower ages (Bosu). Therefore the cut off age of 40 years was necessary because the study considered patients who were on permanent treatment and not those on temporary medication, as in the case with pregnancy

induced hypertension. Furthermore, three months of continuous medication is deemed sufficient for patients to appropriately understand the issues and respond to the questions.

Sample Size

From the available clinical data of the three participating hospitals, there were 21,706 patients who received treatment for hypertension in 2012 as the base year (see Table 1). To determine the sample size, Yamane's simplified formula $n = N/ [1 + N (e)^2]$ provided by Israel (1992) was used. According to the formula, "n" is the sample size required, and "N" is the population of patients with hypertension, while "e" is the 5% margin of error at the 95% confidience limit. With the 21,706 as the estimated hypertension population size, the expected sample was 392 (at 95% confidence and 5% margin of error). Computation of the sample size is shown in appendix A.

Sampling Procedures

The convenience sampling method was used to collect data from patients who met the inclusion criteria namely, known hypertensive, patients on anti-hypertensive medication for at least three months, 40 years and above, and given consent to participate in the study. The initial systematic sampling failed because specific data for known hypertensive patients were haphazardly kept or were not identifiable in the records of two of the three hospitals. Secondly, contact numbers and specific addresses were not available for some selected respondents. Thirdly, ten respondents who were reached on phone for consent to be interviewed refused the interview questioning why their diagnoses were divulged. Others claimed they were unaware that they were being treated for

hypertension. These reasons made it difficult to proceed with the systematic approach. The convenience sampling was the next appropriate alternative at the time of data collection.

The triage nurses were familiar with known hypertensive patients and were found to be the right sources for identification of the respondents for the subsequent interviews. Therefore, patients who met the inclusion criteria and were available during data collection were interviewed daily at the outpatient departments of the three hospitals. In addition, patients who consented but complained of delay at the hospital were interviewed at their homes and work places respectively until the appropriate sample was attained in five months.

Purposive sampling was then used to select eight respondents among those who were interviewed at the out-patients departments, for the qualitative survey. The eight purposively selected respondents were made of four (4) males and four (4) females. They were four adherent participants who obtained scores of eight (8), and four non-adherent participants who obtained scores less than eight (8) after the baseline data was analysed. Purposive sampling was to ensure that only four (4) respondents who scored exactly eight (8) on the adherence scale and four non-adherents who scored extremely less than eight (8) were interviewed. These were extreme cases which reflect the success and failure of patients' adherence behaviour, and was done to identify differences between the adherent and the non-adherent patients to act as lessons for practice.

Quantitative Survey Instruments

Three (3) main instruments were used to collect quantitative data. The first two (2) were the Morisky Medication Adherence Scale questionnaire (MMAS) and the Revised Illness Perception Questionnaire for hypertension

(IPQ-R). The third set of questions was based on demographic information, clinical history, lifestyle, health services, and issues on self-management, adapted from the Ghana Demographic and Health Survey (GDHS) questionnaire (Ghana Statistical Service, 2008), and the WHO STEP questions for epidemiological surveys (WHO, 2008).

These instrument were subject to limitations. For example, the MMAS is a self-reporting instrument, therefore patients could overestimate or underestimate adherence, resulting from a possible recall bias. The IPQR perception questionnaire is also subject to possible interpretation bias and could affect estimation of perceptions. A limitation of the GDHS and the WHO STEP questionnaires is that the questions on socio-demographic variables including age, religion and educational levels were categorized to suit larger population surveys. Therefore these variables were adapted and reclassified to suit this study. However, the interviewers were adequately trained to strictly avoid asking leading questions.

Morisky Medication Adherence Scale Questionnaire (MMAS-8)

The level of patient adherence to medication was measured using the self-report 8-point Morisky Medication Adherence Scale questionnaire (MMAS). The scale was designed to identify both intentional and unintentional patient medication adherence behaviour. It also assesses patients' behaviour regarding the tendency to forget prescriptions, the tendency to stop medication due to perceived improvement in health, suspending medication due to perceived deterioration of one's health, and the difficulties associated with the incessant intake of medicines. It consists of eight (8) questions which are specific to the key behavioural issues usually associated with medication

adherence (see Appendix G). The scale is limited to eight behaviour issues and is not intended to assess all other factors associated with patient medication behaviour. It is structured to measure the level of adherence using the eight (8) stated specific behavioural issues (Morisky et al., 2008).

The Revised Illness Perception Questionnaire (IPQ-R)

Participants' perceptions of hypertension and its management were assessed with the Revised Illness Perception Questionnaire (IPQ-R) for hypertension studies (Moss-Morris et al., 2002; Weinman, Petrie, Moss-Morris, R., Horne. 1996). The questionnaire is a quantitative assessment tool which was developed using constructs of the Self-Regulatory Model framework as adopted for this study. The instrument comprises three (3) main components namely, the illness representation, causes, and the identity.

The illness representation component of the IPQ-R questionnaire assesses patients' knowledge, beliefs, understanding, and perceptions of the hypertension as well as its management. The component has a set of 23 questions which are sub-grouped into seven (7) subscales namely; (i) timeline-chronic or acute, (ii) timeline-cyclical, (iii) consequences, (iv) treatment control, (v) personal control, (vi) coherence, and (vii) emotional response. Timeline-acute or chronic refers to the duration of illness which could be cute or chronic (Moss-Morris et al., 2002). Four (4) questions were used to assess patients' knowledge and beliefs about the duration of hypertension.

Timeline cyclical with two (2) questions determined patients' perception about the pattern or the periodicity of hypertension (Petrie & Weinman, 2006; Weinman et al., 1996, Moss-Morris et al., 2002). The Treatment control subscale assessed the impact of treatment. The scale had 3 questions to elicit

patients' views about their treatment. The Personal control subscale with 3 items assessed personal efforts at controlling blood pressure.

The consequence subscale with five (5) items assesses patients' perceptions about the expected effects of hypertension on their personal lives if blood pressure is uncontrolled (Petrie et and Weinman 2006; Weinman et al., 1996; Moss-Morris et al., 2002). One question on illness coherence assessed whether or not patients understood the information about hypertension as given by health workers. Five (5) questions on emotional representation assessed the patient's emotional reactions towards the condition (Hagger, & Obell. 2005; Moss-Morris et al., Weinman et al.). All question items were ranked on a 5-point likert scale with scores from 1 to 5, ranging from "strongly disagree" to "strongly agree". The scale was later transformed into a 3-point perception index namely low, moderate, and high to facilitate analysis.

The Identity component of the illness perception questionnaire assesses patient perceptions about symptoms of hypertension. The scale has a list of 19 symptoms generally reported by patients with high blood pressure (Weinman et al., 1996; Moss-Morris et al., 2002). It is composed of three (3) sections classified as: symptoms frequently experienced, beliefs that symptoms are related to high blood pressure, and beliefs that symptoms are related to the effect of medicine. Either "yes" or "no" response to a symptom refers to whether patients experience the symptom after they were diagnosed. Secondly, whether they attribute the symptom to hypertension, and thirdly, whether they attribute the symptom to the medicine (Weinman et al.; Moss-Morris et al.).

The Cause component determines patients' perception about the probable causes of hypertension. The causal component was not independently

used as a scale as instructed (Chen et al., 2009; Moss-morris et al., 2002). However, the 18 item questions were further grouped under four (4) subscales namely; (i) the psychological attribute subscale, (ii)the risk factor subscale, the (iii) immunity subscale, and (iv) the chance or accident subscale. These subscales are defined by questions that were specific to each component. For example, the risk factor subscale included variables such as diet, alcohol, smoking, and overweight (Moss-Morris et al.; Weinman et al.). According to Chen et al. questions on accident and germs may be excluded because, these factors were irrelevant to the aetiology of hypertension (Chen et al.). Hypertension is not induced by germs, viruses, or by chance, according to medical knowledge. However, the subject of this study was to determine the extent to which patients are given accurate information about the risk factors of hypertension.

Instrument for Collection of Socio-demographic Data

A structured questionnaire was used to collect respondents' socio-demographic data which include age, gender, marital status, and education. Others include place of residence, income level, occupation, and religion. Questions were obtained from the GDHS (Ghana Statistical Service, (2008) and the WHO STEP survey instruments (WHO, 2008). The other forms of data were lifestyle, clinical history, health care, and self-management factors.

Data on patient lifestyle practices such as tobacco and alcohol use, exercise, and knowledge of appropriate diet were collected. Clinical data were types of anti-hypertensions, co-morbidity, and family history of chronic illnesses. Health care system data include information on access to health care, the consultation process, health education, cost and availability of medicines

(Krousel-Wood et al., 2011; WHO, 2008). Patient history and health related data were obtained from patient medical records and interviews. Assessment of self-management practices were based on questions about home blood pressure monitoring, knowledge of disease, alternate care, and social support (Krousel-Wood et al.; Krousel-Wood, Muntner, Islam, Morisky, Webber, 2009).

Instrument for Qualitative Data

A semi-structured interview guide with three main themes was used to collect information from the eight participants. The first theme assessed patient's perceptions and beliefs about hypertension, the second sought participants' views about treatment and the third covered their views about lifestyle practices (Appendix H).

Blood Pressure Measurements

Blood pressure values were captured from patient records as recorded by nurses during the hour of the interview. Furthermore, trained nurses among the research team recorded patient blood pressure at home and work places. Both the standard mercury sphygmomanometers and the Omron electronic blood pressure apparatuses were used together at the triages in the hospitals. Even though a combination of the instruments raised issues about measurement errors, the trained nurses had the capacity to identify abnormal readings.

Determination of Body Mass Index

Body Mass Index (BMI) as a measure of the level of obesity was calculated as "weight in kilograms divided by the square of height in metres (kg/m^2)". Body Mass Index was categorised according to the WHO criteria as:

Underweight (BMI < 18.5), Normal weight (18.5 ≤ BMI <25.0), Overweight (25.0 ≤ BMI < 30.0), and Obese (BMI ≥ 30.0) [WHO, 2006].

Training and Pre-Test of Instruments

A two-day training session on interviewing skills and interpretation of questions was conducted for four (4) research assistants in November, 2013. The four research assistants were two (2) nurses and two (2) health information Officers (Appendix I). There was a role-play to ensure that the research assistants understood the questions. The nurses read anthropometric data and participated in the interviews while the information officers only conducted the interviews.

The pre-test exercise was conducted at the out-patient department of Abura Dunkwa District Hospital in the Central Region. Abura Dunkwa District Hospital was selected for the exercise because it was the nearest primary health facility with the status of the two selected primary hospitals among the three study facilities. Furthermore, the Abura Dunkwa District shares boundary with Cape Coast, and have similar population characteristics. People from Abura Dunkwa also patronize hospitals Cape Coast.

The exercise was conducted to identify weaknesses with the questionnaires. The results revealed how some of the patients were uncomfortable with questions regarding alcohol and smoking. Some patients were hesitant in revealing their statuses when they were asked whether or not they smoked or took any alcoholic beverage. Their initial responses to questions on alcohol and smoking was a direct "No" answer. Based on this observation, the order of four questions on smoking and alcohol intake was rearranged. Thus, instead of the question "do you currently smoke cigarette?" we asked "In the

past 24 hours, how many sticks of cigarettes did you smoke?" then followed by "do you currently smoke cigarette?" Similarly, "what type of alcoholic beverage do you take?" was asked foremost followed by "do you currently take alcohol?" The order of the four sensitive questions was repositioned to avoid a direct "No" response to issues on smoking and alcohol in case the respondent indulges in drinking or smoking. Therefore a limitation regarding the population based standard GDHS and the WHO STEP wise question instruments was identified and changes made to suit the purpose of this study.

Ethical Clearance

Ethical clearance was obtained from the Ghana Health Service's Ethical Review Board (Appendix K). Copies of the clearance letters were sent to directors of the University Hospital, Metropolitan Hospital and the Cape Coast Teaching Hospital. The researcher held meetings with the Medical Directors to discuss the study. Final approval was obtained based on the agreement that copies of the final report would be made available to the participating hospitals. The Out-patient, Medical Records and the Pharmacy departmental heads were served with copies of the approved letters with further instructions from the medical directors to support the research team (Appendix J).

Quantitative data Collection Process

Before data collection commenced, authorities of the three hospitals gave approval for use of the facilities, and instructions to the Out-patient departments as well as the Pharmacies and Medical Records divisions. Data was collected in two forms; community and hospital based. Patients who were identified from the consulting room registers were contacted on phone. Those

who gave consent were visited at their homes or work places at the cost of the principal investigator. Ten of such respondents refused consent raising issues about confidentiality. Others claimed they had travelled outside the metropolis.

The hospital based data was collected with final permission from triage nurses, doctors, and consulting room nurses to enroll patients. Nurses at the out-patient departments were approached to identify known hypertensive patients for the research assistants. Known hypertensive patients who attended the outpatient receptions to have their vitals recorded were identified. Patients who met the inclusion criteria were identified by their long history of repeated visits and prescription refills. Nurses explained the reasons for the study to the patients and directed those willing to participate in the study to research assistants who were seated at secluded places.

The research officers orally explained the objectives of the study to participants before commencement of interviews. Once consent was obtained, verification in respect of the inclusion criteria was done. Patients who participated consented by signing the consent form (Appendix F) at the start of the interview session. However, some patients refused to consent, complaining of fatigue after waiting for long hours at the hospitals. The face-to-face interview method was used except for patients who self-administered the questionnaire with little guidance, and those who took questionnaires away with a promise to return them.

Respondents were seated at convenient areas for the interview to ensure privacy. Some respondents were interviewed while they waited for their turn to see the doctor; others were interviewed after the consultation process. Participants who consented but could not wait provided contact numbers and

were later interviewed at their homes or at work places in their convenience. The principal supervisor visited and observed some of the interview sessions. Three hundred and sixty questionnaires, representing 92 percent response rate of the maximum sample size were received in the first phase of the survey.

Qualitative data collection process

The second phase of data collection was conducted for eight (8) purposively selected respondents after data for the quantitative survey was analysed. These were four (4) extremely adherent and four (4) extremely non-adherent patients. The rationale for the follow-up interviews was explained to participants. Prior to the commencement of the interview, individual participants were told their levels of adherence from the results of the baseline survey. The reason was to make participants aware of their statuses so as to ensure that the appropriate questions were asked. One research assistant engaged each participant in the interview using both audio and manual recordings. Blood pressure, weight and height values were recorded before the interview commenced. Questions were varied and tailored to suit both the adherent and the non-adherent participant. For instance, "What will you consider to have been the factors which have facilitated your ability to adhere to drug instructions?" was asked of the adherent participant, while "What will you consider to be your difficulty with following drug instructions?" was also asked of the non-adherent participants.

Field Experiences

Few challenges were encountered during the data collection sessions. At the hospitals, some participants complained about delay, having waited for

hours to receive treatment. Therefore, such participants were not interviewed even though they expressed interest. Four (4) patients stopped in the middle of the interview sessions with explanation that they had to attend to other issues. They were later contacted at their homes or the work places for the interview. The four (4) respondents who failed to complete the initial interviews were provided with fresh questionnaire.

At the communities, ten (10) potential respondents refused to receive the team, claiming they were not hypertensive. However, other respondents were excited and eager to have their blood pressure measured. They took the opportunity to ask questions, which the team's nurses responded. One lesson learnt is the need for community level education on a wide range of ailments, including hypertension.

Data Processing and Analyses

A sample of 392 questionnaire went out, however, 360 were returned representing a response rate of 92 percent. This resulted because some of the respondents who opted to personally answer questions without guidance, failed to return them. Others later refused to participate in the study after earlier consenting and taking questionnaires. Of the 360 questionnaire received, 10 were rejected for non-completion. Re-entry was conducted for 20 randomly selected questionnaires to verify data input quality. Key variables were assessed for missing values and outliers. Variables with at least 20 percent non-response or missing values were excluded in the analysis as recommended by Tabachnick and Fidell (2007). As a result, income was discarded because it was found that 80 percent of the respondents refused to disclose their income levels.

Variables such as age, systolic, and diastolic were examined for normality using the Shapiro-Wilks test, skew test, as well as inspection of histograms. The Shapiro-Wilks normality test for these variables registered p-values less than 0.05, and being significant, they were not normally distributed (Tabachnick and Fidell, 2007). Therefore, some variables including age, systolic, and diastolic were transformed into categories to facilitate the analysis.

Data Transformation

Key variables which were not normally distributed were categorised to facilitate analysis. The main dependent variable for the study was categorised as "adherence to medication" and coded "1" for being adherent to medication, and "0" for being non-adherent. Therefore, a respondent who scored a total of 8 on the MMAS scale was recoded as 1 to represent "adherence" and a total score < 8 was recoded as "0" to represent "non-adherent".

Selected independent variables were also transformed into various forms: age was grouped into 40-49, 50-59 and 60-69, and ≥ 70 years; marital status was categorised into never married, married, and divorce/widowed; educational status into levels as no formal education, primary, secondary and tertiary; number of prescribed anti-hypertensive medicines into 1, 2, 3, 4 and >4. Other transformations are comorbidity or no presence of other chronic illness (such as diabetes and asthma); presence of hypertension in family; Duration of medication, categorised into, < 5 years, 5-10 years, >10 years; controlled blood pressure versus uncontrolled blood pressure; monitor blood pressure at home versus do not monitor blood pressure at home; receive home support; understand treatment instructions, and receive all medicines at the hospital.

Analysis of Socio-demographic Data

Age, blood pressure values, weight, and height were summarised in means, standard deviations, and frequencies (Appendix B). These variables were also transformed into categories to facilitate analysis. Categorical variables such as age, gender, education, and religion were expressed in proportions using cross tabulation. Tables, graphs and maps were used to present findings. Characteristics of participants were assessed to determine commonality among hypertensive patients in the Metropolis. Participant characteristics were compared to other studies to determine differences and similarities among hypertensive patients. The Chi-square model was used to analyse associations between socio-demographic variables, illness perception constructs, and medication adherence.

Independent Variables

Patients' ability to adhere to hypertension medication is affected by Socio-demographic, Biometric, Self-Management, and Health Care Systems factors. The specific variables being considered are age, gender, educational level, marital status, occupation, religion, and Multiple Morbidity. Other factors are family history of hypertension, number of anti-hypertensive, frequency of dosage, availability of medicines, understanding medication instructions, and the constructs of illness perceptions. The Chi-square test was used to assess the factors that may influence medication adherence among the patients.

Determination of Medication Adherence Levels

The main outcome measure was adherence to medication, which was originally categorised as: low adherence (score < 6), moderate adherence (score

6 < 8), and high adherence (score = 8) by the scale developer (Morisky et al., 2008). The three categories were further dichotomised as low adherence (score < 8) and high adherence (score = 8) in this study. Low and moderate adherence categories were combined to facilitate analysis using the Chi-square test (Kretchy et al. 2014c).

The level of adherence was calculated using the 8-point Morisky Medication Adherence Scale (Morisky et al., 2008). Participants answered "Yes" or "No" to seven questions. The eighth question, which related to difficulties with remembering to take medication, was scored on a 5-poing likert scale with a range of 0-4 (all the time - never/rarely).

Individual adherent levels were determined by first summing all the non-zero scores to the responses, which were then categorised according to the Morisky Adherence Scale. For the purpose of the study, a participant was classified as adherent when he or she scored exactly 8 on the MMAS scale. Participants who scored less than 8 on the MMAS scale were considered non-adherents (Kretchy, 2014c). The significance of the stringent cut-off (below 8 and at 8), was to ensure high response ratings. Adherence levels and socio-demographic factors were further analysed using the Chi-square test for significant relationships.

Determination of Illness Perception Scores

The illness perception instrument comprised three (3) main components: (i) the Illness Representation, (i) the Identity, and (i) the Cause sub-scales. Scoring and analysis of these sub-scales were performed differently. Responses to both the illness perception and the causal scale items were scored on a five-point Likert scale of 1-5, ranging from strongly disagree to strongly agree

(Moss-Morris et al., 2002; Weinman et al., 1996). However, the five-point Likert scale was categorised into a three level nominal scale to facilitate analysis. The three level composite perception index representing "Low", "Moderate", and "High" was created to measure patients' perception of hypertension on the 5-point Likert scale. The minimum number of responses represented by X1 and the maximum number of responses X5 were used, where X represents the number of items under each domain. With a composite number of items being 23, the minimum expected score X1 is 23, and the maximum expected score X5 is 115, producing an interval of 92/3 = 31. Therefore the cut-off for the three level composite index were Low (23-54), Moderate (55-86), and High (67-115). Patients' perceptions of hypertension were determined by the proportions of the aggregate scores in each category of the index. This was done for the illness representation and causal sub-scales.

Relationships between the illness perceptions constructs and the socio-demographic background characteristics of the patients were assessed by inspections of proportions using the Cross tabulation. Finally, the Chi-square was applied to assess which of the dimensions of illness perceptions associates with medication adherence. Medication adherence as the dependent variable, with Timeline Acute/Chronic, Timeline Cyclical, Consequence, Personal Control, Treatment Control, Coherence, as well as emotional control representing the independent variables.

The identity scale of the illness perception instrument has three sections namely; (i) experience with a particular symptom, (ii) belief that the symptom is related to hypertension, and the third section representing (iii) belief that the symptom is related to effect of the medicines. The first section has "Yes" or

"No" responses to a list of nineteen frequently identified perceived symptoms of hypertension (Moss-Morris et al., 2002). A "yes" answer to a symptom in the first of the three sections indicate experience with the symptom, and a "No" answer indicate no experience with the symptom. The frequency of "yes" scores to a particular symptom represents the proportion of respondents with experience of the symptom (Moss-Morris et al.).

The second section represents beliefs that the symptom is caused by hypertension, and has "Yes", "No", and "Don't know" answers. Only patients who experience the particular symptom in the first section proceed to answer the related question in the second section. The frequency of "Yes" answers to the symptom indicate the proportion of patients who attribute the particular symptom to hypertension. The third section represents beliefs that the symptom is caused by the effect of medication. This section also has Yes", "No", and "Don't know answers. The frequency of "Yes" responses in the third section represents those who attribute a particular symptom to the adverse effect of medicines (Smith, Llewellyn, Woodcock, White & Frew, 2012; Figueiras & Alves, 2007).

A three (3) level perception index was created for the 19 symptoms with 1-6 symptoms to represent "Low", 7-12 symptoms representing "Moderate", and 13-19 symptoms representing "High". Since hypertension is known to be a symptomless condition, a patient who identifies 1-6 of the symptoms is said to have a low misconception about symptoms of hypertension, 7-12 symptoms implies the patient has moderate misconception of the symptoms. Thirdly, a patient who identifies with 3 or more of the suggested symptoms is said to have high misconception of the condition. Patients' level of misconception was

assessed by the counts of symptoms identified in the various categories of the index as expressed in percentage.

The Chi-Square Model

Various models are used to analyse associations among categorical variables which are measured at the nominal and ordinal scale levels. Among these tests are the Contingency Table Chi-Square, McNemar Test, Cochran's Q Test, Kruskal-Wallis test, Mann-Whitney Test, Pearson Correlation Coefficient and the Wilconxin Signed Ranked Test. However, except the Chi-square test, the basic requirements of the other tests that the dependent variable must be continuous or ordinal is not met in this study.

The Chi-square test of independence or the Pearson Chi-square ($\chi 2$) is a statistical tool for hypothesis test where the dependent and the independent variables are measured at the nominal scale. The Pearson's Chi-square test is used for significance test of hypothesis, with the assumption of no relationship between the dependent and independent variables. It determines the significance of observed differences and provides detail information about which cell categories account for the differences (McHughs, 2013; Garson, 2012). It is known as a distribution free or non-parametric test because it is flexible and violates some assumptions pertaining to parametric tests which include the assumptions of normality and equal variance or homoscedasticity (McHughs,; Agresti, 2007).

The Chi-square is based on the assumptions that data in the cells are counts or frequencies, the variables are mutually exclusive, and that the study variables are independent. Furthermore, the two categorical variables are nominal, the value in each expected cell is 5 or more in at least 80 percent of

the cells, and no cell has expected frequency less than 1. One limitation of the Chi-Square test is that the significant test for the distribution is not very accurate with smaller samples. In this case the Fisher's exact test is used to improve the statistic (Field, 2009; Agresti, 2007). It is further strengthened by the Cramer's V test, thus making it robust (Field; Agresti; Tabachnick and Fidell, 2007).

The formula for the Chi-square test is the sum of, observed values minus the expected values squared, divided by the expected:

$$\chi^2_{i\text{-}j} = \sum \frac{(O-E)^2}{E}$$

Where:

$\chi 2$ = the cell Chi-square value

O = observed value of the actual count of cases

E = expected value

$\Sigma \chi 2$ = sum all the cell Chi square values

X^2 *i-j* = all the cells, from the first cell i to the last cell j

The model was chosen for the analyses because the dependent and independent variables are dichotomous. The assumptions of the Chi-square statistic were also satisfied; the data were in counts, and the categories were nominal and mutually exclusive.

The Chi-square statistic was used to test the hypothesis that there is no significant association between patient perception, age, level of education, and medication adherence. To assess whether the statistically significant $\chi 2$ result is meaningful, related standard tests such as the Phi and Crammer's V were used to provide information about the strength or magnitude and direction of the relationships. The Phi measured the strength of association in 2x2 contingency

tables where the two variables are strictly dichotomous, each with two categories. The phi statistic falls between 0 and 1 with 1 denoting very strong association and 0 denoting very weak association. The Cramer's V on the other hand is applied in contingency tables with more than two categories. It was used where one of the two variables has more than two categories. The statistic lies between 0 and 1, where 1 means perfect association indicating that the independent variable is highly associated with the dependent variable (Field, 2009).

Though the Chi-square measures the overall significance of the association between the two variables, related tests assess which cell contributes effectively to the overall significance. The Standardised Residual was used to decompose the significant $\chi 2$ to determine which cell contributes to the overall significance. It takes the form of a z-score ± 1.96, $p < 0.05$. There is significance effect where the Standard Residual for a cell is > 1.96 ($p<0.05$). A positive standardised residual value means the cell contributes more to the significance than expected, and a negative standardized residual means the cell contributes less effect than expected (Field, 2009).

Tests for Hypotheses

The $\chi 2$ was used to assess if Age, Education, and Constructs of the Illness perceptions significantly associate with medication adherence. Related tests which are the phi, Cramer's V, and the Standardized Residual were used to measure the strength, direction and effect of associations. Selected health related factors which include duration of hypertension, understanding treatment, and receiving all prescription were assessed. Other variables such as Receiving

Home Support, Regular Blood Pressure checks, and observing Diet Control measures were included in the model for assessment.

Qualitative Data Analysis

Qualitative data from eight purposively selected respondents were manually analysed. An independent analyst transcribed the tape recordings of the eight respondents. Transcribed data were reconciled with the manual recordings to validate the findings. The responses were organised in a table by theme, topic, age and sex of respondents. Significant ideas, behaviours, practices in respect of the issues discussed were identified under each of the three themes, namely perceptions of hypertension, experiences with treatment and lifestyle modifications. Implications and conclusions were then drawn from the findings (Creswell, 2003). Though qualitative data software such as NVIVO could have been used, the data was manually analysed because of the small sample size.

Discussion

The Chapter presents the steps that were taken to collect data, as well as the procedures for analysis. There are issues regarding inclusion of some variables, application of the Likert scale, and transformation of variables, that require further expositions.

The inclusion of perceived causal factors such as accident and germs in the identity component of the illness perception instrument has been criticised. According to Chen et al. (2009), these factors are irrelevant to the aetiology of hypertension and may mislead respondents. Though hypertension is not induced by germs, viruses, or by chance (Chen et al.) the two items were maintained in

the questionnaire with the aim of determining the extent to which patients understand the causes of hypertension.

Secondly, the five point Likert scale was categorised into a nominal scale index making it possible to use the Chi-square since the independent and dependent variables were all nominal. Finally, normality tests were conducted for some continuous variables which showed presence of skewness. Age, number of years with hypertension, and number of years on medication which failed the normality tests had to be transformed into categories to facilitate data analysis. The next chapter explores the perceptions and experiences of hypertension and its management in the Metropolis.

CHAPTER FIVE

PERCEPTIONS AND EXPERIENCES WITH HYPERTENSION

Introduction

Patients' perceptions and beliefs about illnesses may affect treatment outcomes for chronic diseases such as hypertension. This chapter which is in two sections first discusses perceptions and beliefs of hypertension in terms of symptoms, causes, and treatment, using the illness perception constructs as basis. It then relates the socio-demographic factors which include sex, age, marital status, education, occupation, and religion to the illness perception constructs. The second section of the chapter discusses patients' lived experiences with perceived symptoms of hypertension, treatment and expected lifestyle changes. It further presents information on enabling factors as well as the strategies adopted to improve adherence to treatment.

Background characteristics of respondents

Table 2 presents the socio-demographic background and biometric data of the respondents. These are sex, age, marital status, education, occupation, religious affiliation, and Body Mass Index. Two out of three of the 350 patients were female. Over one-third (36.3%) of the respondents were between 50 and 59 years (36.3%), with a higher proportion of female patients in the group (female 38.6%; male 31.6%). In Table 2, the prevalence of hypertension among the age groups was quite even, except for patients between 50 and 59 years.

More than half of 350 patients were married and living with their partners (54.9%), and close to a third had either divorced or were widows (36.9%). There were more female divorcees or widows than married (female divorced 48.5%; female married 47.2%), and more married men, than male

divorcee (married male 70.1%: divorced male 13.7%). The proportion of married female to divorced/widowed female patients was closer, but female divorcee were slightly higher (married female 47.2%: divorced female 48.5%). Furthermore, there were more unmarried male than unmarried female respondents (male 16.2%; female 4.3%). The results point to a high prevalence of hypertension among married couple as well as the divorced or widowed (see Table 2).

The prevalence of hypertension was higher among respondents with lower levels of education, notably among those with primary level education (52.3%), and among those with no formal education (23.7%), than those with secondary (10.9%), and tertiary education (13.1%). The proportion of male respondents who had attained primary education was higher than the females with primary education (male 53.8%; female 51.5%), as well as tertiary education (male: 24.8%; female: 7.3%). The female patients who had no formal education (70) were more dominant compared to 13 male with no formal education (female: 30.0%; male: 11.1%). Among those with secondary education 26 were female and 12 male (see Table 2).

Approximately 41 percent (40.8%) of the patients were either unemployed or had retired. There were high unemployed females than males (female: 45.9%; male: 30.8%). A higher proportion of those working were engaged in service and marketing (33.7%), with 62 percent of those engaged in the service sector being female (see Table 2).

Nearly 60 percent (56.9%) of the patients were orthodox Christians with 199 being Catholics, Methodists, and Presbyterians.

Table 2: *Socio-Demographic and Biometric Characteristics by Sex*

Factor	Sex					
	Female		Male		Total	
	No.	%	No.	%	No.	%
Total	**233**	**66.6**	**117**	**33.4**	**350**	**100.0**
Age						
40-49	36	15.5	29	24.8	*65*	18.6
50-59	90	38.6	37	31.6	127	36.3
60-69	53	22.7	24	20.5	77	22.0
70-90	54	23.2	27	23.1	81	23.1
Marital Status						
Not Married	10	4.3	19	16.2	29	8.2
Married	110	47.2	82	70.1	192	54.9
Divorced/Widowed	113	48.5	16	13.7	129	36.9
Educational Level						
No Formal Education	70	30.0	13	11.1	83	23.7
Primary (6 years)	120	51.5	63	53.8	183	52.3
Secondary (9-12 years)	26	11.2	12	10.3	38	10.9
Tertiary (>12 years)	17	7.3	29	24.8	46	13.1
Occupation						
Unemployed/Retired	107	45.9	36	30.8	143	40.8
Professional/Management	27	11.6	24	20.5	51	14.6
Services/Marketing	74	31.8	44	37.6	118	33.7
Agriculture/Fishing	25	10.7	13	11.1	38	10.9
Religious Affiliation						
Christian Orthodox	125	53.6	74	63.2	199	56.9
Christian Charismatic	57	24.5	18	15.4	75	21.4
Islam	42	18.0	19	16.3	61	17.4
Other Religion	9	3.9	6	5.1	15	4.3
Clinical						
Presence of Comorbidity	106	45.5	43	36.8	149	42.6
Family history of Hypertension	109	46.8	48	41.0	157	44.9
BMI Range						
Underweight (<18.5)	2	0.9	1	0.9	3	0.9
Normal Weight (18.5-24.9)	38	16.3	34	29.1	72	20.6
Overweight (25-29.5)	67	28.8	36	30.8	103	29.4
Obese (30.0+)	126	54.1	46	39.3	172	49.1

Source: Field data, (2014)

Twenty-one (21 percent) were Charismatic, and 17 percent were Muslims. Fifty-four percent of the females were orthodox Christians against 64 percent of male respondents. Fifteen (15) patients made of 9 female and 6 male belonged to other religions such as the African Traditional Religion (see Table 2).

The presence of other chronic illnesses (co-morbidity) accounted for 43 percent of the sample. Of the 149 patients with co-morbidity, 46 percent were female compared to male (37%). Close to 45 percent of the patients linked their condition to family inheritance. Also shown in Table 2, nearly half of the respondents (49 percent) were obese (172), 29 percent (103) were overweight, and 21 percent (72) were of normal weight. Two patients, a male and a female were underweight. Obesity was higher among the female respondents (54.1%) than male (39.3%). Overweight was slightly higher among the male respondents (30.8%) than females (28.8%).

Perceptions of Hypertension

Patients' perceptions of hypertension were assessed using the illness perception constructs of the Self-Regulatory Model, which are labelled as Timeline Acute/Chronic (A), Timeline Cyclical (B), Consequence (C), Personal control (D), Treatment Control (E), Emotional Control (F), and Coherence (G) as presented in Tables 3 & 4. The causal factors are Psychological, Lifestyle, Immunity, and Accident /Chance (see Table 5).

As discussed in Chapter Four, the levels of patient perceptions of hypertension were determined by the degree to which respondents agreed or disagreed with each of the illness perceptions and causal items. A 5-point Likert scale with values ranging from 1-5 was used to score respondents' opinion about

the questions presented in Table 3. A three level perception index representing "Low", "Moderate", and "High" was created to measure patients' perception of hypertension. Taking account of the minimum (X1) and the expected maximum scores (X5), the three level index was created with cut-off as Low (23-54), Moderate (55-86), and High (87-115). The proportions of the aggregate scores as captured under the indices are presented in Tables 3 & 4. Table 3 indicates patients' assessment of the individual question items, providing further details about the reasons respondents gave for each construct. Table 4 on the other hand relates the individual constructs with the socio-demographic background of the patients.

Timeline acute or chronic (A) is conceptually defined as the patient's perception about the likely duration of the condition (Petrie & Weinman, 2012). Higher score of this construct suggests the notion that the illness is likely to last for a longer time. Lower score for timeline acute indicates hypertension is treatable in a short term. The reasons provided for the timeline acute/chronic scores as shown in Table 3 suggest that 65 percent of the participants had low convictions that hypertension would last for the rest of their lives, less convinced that hypertension is permanent rather than temporary (low perception, 55%), and low perceptions that hypertension will last for a long time (low perception 58%). They were also of the view that the condition would improve with time (high perception, 53.4%).

Overall, 42 percent of the respondents held moderate perceptions about the long duration or chronicity (A) of hypertension, compared to those with low perception (36 percent), and high perception (22 percent) as shown in Table 4. The results indicate inclination towards short term beliefs, suggesting

disagreement with the long term nature of hypertension (see Table 4). This suggests that patients perceive hypertension as an acute illness and treatable within a short time.

As shown in Table 4, an equal proportion of the males (42.7%) and females (42.1%) held moderate perceptions about the chronic nature of hypertension. Respondents between ages 40 and 49 (55.4%), those who had never married (51.7%), those with secondary education (44.7%), professionals (45.1%), and those of other religions (46.7%) also showed moderate agreements with the long term duration of hypertension. In contrast, higher proportions of respondents between 70-90 years, those without formal education (47%), those in agriculture (52.6%), and Muslims (47.5%) held low perceptions that hypertension is a long term condition. The general perception is that hypertension is curable within a short time. Therefore, the patients' views do not support the medical view that hypertension is a chronic condition which cannot be cured within a short time (Horne et al. 2010).

Timeline Cyclical (B) refers to instability, which means hypertension occurs intermittently. Higher scores for the cyclical concept refer to instability, and lower scores indicate stability (Chen et al., 2009). As shown in Table 3, two-thirds of the respondents held low to moderate perceptions or disagreement that hypertension is unpredictable (70 percent), suggesting they could predict occurrence of hypertension. Furthermore, 88 percent held moderate to high perceptions or agreement that it comes and goes in cycles, meaning hypertension suddenly occurs and stabilises. The results suggest that hypertension is an unstable condition (see Table 3).

Generally, 74 percent of the respondents have moderate to high perceptions about the cyclical (B) nature of hypertension, compared to those with low perceptions (26.3%) as shown in Table 4. The scores show inclination towards agreement that hypertension is not stable and that it occurs intermittently.

Further in Table 4, there were moderate perceptions among male and female respondents about the cyclical nature of hypertension (male: 37.6%, female: 37.3%). One-half of the patients between 40 and 49 years (55 percent), 48 percent of those in tertiary education, and 44 percent of Charismatic Christians, also held moderate perceptions that hypertension occurs intermittently. However, 45 percent of respondents who had not married, and 45 percent of those with professional jobs held higher perceptions about the cyclical concept (Table 4).

"Consequence (C)" is defined as the impact or the negative effects of the illness on patients' life. It reflects the effect of illness on work, family, lifestyle and finances (Petrie & Weinman, 2006). While a higher score for the construct indicates belief in the negative impact of the condition, lower score is an indication of less negative effect. Details in Table 3 show that hypertension poses no difficulty to persons closer to the patients (low perception, 77.7%), indicating less negative impact on family members. Fifty-four percent of the patients had low perceptions of any financial consequence, or do not worry about any serious financial burden. Further, 39 percent did not consider high blood pressure to be a serious disease burden. While eight out of ten patients (80.6%) were less stigmatised by the presence of the condition, 74 percent also held low to moderate perceptions that hypertension affects their lives. As shown

in Table 4, 87 percent of the patients were found to have low to moderate perceptions about the negative consequences (C) of hypertension, compared to those with high perceptions (13 %). The results suggest that patients are less concerned about the negative impact of hypertension.

Over half (52 percent) of the female patients held moderate perceptions about the consequences of hypertension (Table 4), 56 percent of the male respondents rather held lower perceptions about any serious consequence of hypertension. Furthermore, 47 percent of those aged between 50 and 59 years, and 57 percent of those of the Islamic faith have moderate perceptions about any negative impact of the disease. However, those who had never married (51.7%), those who have attained tertiary education (63.0%), and the professionals (51.0%) were found to show lower perceptions of its negative impact. Thus, the male, singles, those with tertiary education, and the professionals, in particular, were less concerned about any negative effects of hypertension on their lives.

Personal control (D) reflects patients' beliefs in their personal abilities to manage blood pressure (Mcmanus, 2011; Ross et al., 2004). As indicated in Table 3, the patients have moderate beliefs that their actions determine blood pressure levels and that they have the power to control hypertension. In total 82 percent of the respondents were of moderate to high perceptions in their personal control (D) abilities, compared to 18 percent for those with low perceptions (see Table 4). Forty-six percent of the males and 41 percent of females moderately believed they could personally manage high blood pressure. Forty-four percent of married respondents, 47 percent of the patients with secondary education, 47 percent of those engaged in professional jobs, and 46

percent of other religions were found to hold moderate perceptions of the concept. However, forty-six percent of persons aged between 70 and 90 years held higher perceptions in their personal control abilities, indicating that the aged are more motivated to be responsible for blood pressure control.

Treatment control (E) is conceptually defined as patients' beliefs in the effectiveness of treatment. High perception scores indicate believe in the treatment. Details shown in Table 3 indicate that 98 percent of the participants have moderate to high perceptions that the medicines can control hypertension. Furthermore, 93 percent held moderate to high perceptions of the effectiveness of treatment to stop any negative effects of high blood pressure (51%). However, 71 percent held low to moderate perceptions that the treatment can cure hypertension, suggesting that the treatment may not cure hypertension. On the whole, 90 percent of the respondents showed moderate to high perceptions of the treatment to control blood pressure, compared to 10 percent for those with low perceptions (see Table 4). Based on the sample, the results indicate patients' faith in the effectiveness of the medicines to control of hypertension.

Both males and females held similar views about treatment; 51 percent of the females and 49 percent of the males were convinced that the treatment could control hypertension. Fifty-seven percent of those between 40 and 49 years, 51 percent of those married, and 50 percent of the divorced were found to have high perceptions in their medication (see Table 4). Patients with primary education (53.6%), service providers (59.3%), and those practising Islam (60.7%) also held high perceptions in their medicines.

Table 3: *Assessment of illness Perception Concepts*

Construct / items	Perception		
	Low %	Moderate %	High %
Timeline Acute-Chronic (4)			
Hypertension will remain the rest of my life	64.9	17.7	17.4
Hypertension is permanent	55.2	23.7	21.1
Hypertension will last for a long time	58.0	25.1	16.9
Hypertension will improve in time	6.9	39.7	53.4
Timeline Cyclical (2)			
Hypertension is very unpredictable	37.7	32.3	30.0
Hypertension comes and goes in cycles	12.0	50.6	37.4
Consequence (5)			
Hypertension causes difficulties to persons close to me	77.7	12.9	9.4
Hypertension has serious financial consequences	54.0	20.0	26.0
Hypertension is a serious/bad condition	39.4	30.0	30.6
Hypertension affects how others see me	80.6	13.4	6.0
Hypertension has major consequences on my life	34.0	39.7	26.3
Personal Control (3)			
My actions determine whether blood pressure is better	10.0	59.7	30.3
I have the power to influence my blood pressure	8.6	44.3	47.1
The course of my HBP depends on me	35.7	37.2	27.1
Treatment Control (3)			
The treatment can control my hypertension	1.7	45.1	53.2
The treatment can cure my hypertension	40.0	31.1	28.9
Treatment can stop negative effects of blood pressure	6.9	42.6	50.5
Emotional Control (5)			
My hypertension makes me depressed	55.1	25.5	19.4
My hypertension makes me feel afraid	56.6	23.4	20.0
My hypertension makes me feel angry	75.4	16.0	8.6
My hypertension makes me upset	58.6	29.7	11.7
My hypertension makes me feel anxious	47.7	26.0	26.3
Coherence (1)			
I have clear understanding of my hypertension	52.0	32.9	15.1

Source: Field data, (2014)

Patients sometimes show emotions towards long term diseases such as hypertension, when they are told of the diagnosis. The emotional control (F) construct refers to patients' emotional reactions to the possible threats or dangers of the illness usually expressed in fear, anger, depression and anxiety (Chen et al., 2009). In Table 3, 55 percent of the patients were less depressed, 57 percent were less fearful, 75 percent showed less anger, 59 percent were not upset, and 48 percent showed less anxiety about their condition.

As shown in Table 4, 84 percent of the patients held low to moderate emotional perceptions of hypertension (F), compared to those with high emotional perceptions (16 percent). Males (low perception, 56 percent), compared to the female respondents (low perception, 41 percent) showed less emotions. The older adults of 70 years (low perception, 54 percent) and the divorced/widowed (low perception, 47 percent) also held low emotions about their condition. Fifty-seven percent of respondents with tertiary education, 53 percent of the professional and the 51 percent of Muslims were equally less emotional about their condition. The results generally suggest that patients with hypertension have perceptions of less fear, anger, depression, and are less anxious about their condition.

The interpretation stage of the Self-Regulatory Model requires clinicians to ensure that patients have clearer understanding of the disease. Illness Coherence (G) conceptually refers to the extent to which patients clearly understand the illness. Higher perception scores on the scale means a clearer picture of hypertension. More than half of the patients (low perception, 52 percent) were found to exhibit low knowledge about the nature of hypertension (Table 3).

Table 4: *Relationship between Socio-Demographic Factors and Perceptions of Hypertension*

Factor /construct	A			B			C			D			E			F			G		
	L %	M %	H %	L %	M %	H %	L %	M %	H %	L %	M %	H %	L %	M %	H %	L %	M %	H %	L %	M %	H %
Total (350)	36.0	42.3	21.7	26.3	37.4	36.3	42.3	44.9	12.8	18.5	42.9	38.6	9.7	40.0	50.3	45.7	38.0	16.3	52.0	32.9	15.1
Sex																					
Female	38.6	42.1	19.3	26.6	37.3	36.1	35.6	51.5	12.9	21.5	41.2	37.3	10.3	38.6	51.1	40.8	41.2	18.0	56.6	28.8	14.6
Male	30.8	42.7	26.5	25.6	37.6	36.8	55.6	31.6	12.8	12.8	46.2	41.0	8.6	42.7	48.7	55.6	31.6	12.8	42.8	41.0	16.2
Age																					
40-49	32.3	55.4	12.3	21.5	55.4	23.1	46.2	44.6	9.2	10.7	43.1	46.2	10.8	32.3	56.9	49.2	33.9	16.9	56.9	32.3	10.8
50-59	31.5	37.8	30.7	25.2	26.0	48.8	39.4	47.2	13.4	14.2	42.5	43.3	6.3	39.4	54.3	38.6	43.3	18.1	49.6	26.8	23.6
60-69	36.4	42.9	20.8	28.6	36.3	35.1	40.3	44.2	15.5	22.0	41.6	36.4	10.4	41.6	48.0	45.5	39.0	15.5	48.0	39.0	13.0
70 +	45.7	38.3	16.0	29.6	42.0	28.4	45.7	42.0	12.3	28.4	44.4	27.2	13.6	45.7	40.7	54.3	32.1	13.6	55.6	37.0	7.4
Marital status																					
Not Married	17.3	51.7	31.0	17.2	30.0	44.8	51.7	37.9	10.4	24.0	37.9	37.9	3.4	48.3	48.3	37.9	48.3	13.8	51.8	31.0	17.2
Married	34.9	42.2	22.9	25.5	37.5	37.0	45.3	42.7	12.0	15.1	44.3	40.6	10.4	39.1	50.5	45.8	37.5	16.7	50.5	33.9	15.6
Divorced/ Widowed	41.9	40.3	17.8	29.5	37.2	33.3	35.7	49.6	14.7	22.5	41.9	35.6	10.1	39.5	50.4	47.3	36.4	16.3	54.2	31.8	14.0

Source; Field data, (2014)

Table 4, *continued*

	A			B			C			D			E			F			G		
Educational status																					
No Formal education	47.0	42.2	10.8	32.5	39.8	27.7	49.4	41.0	9.6	28.9	43.4	27.7	9.6	37.3	53.0	38.6	49.4	12.0	75.9	18.1	6.0	83
Primary Education	33.9	41.5	24.6	25.7	35.5	38.8	33.9	50.8	15.3	15.9	42.6	41.5	9.8	36.6	53.6	44.8	37.2	18.0	54.6	30.1	15.3	183
SSS/JHS/Voc /Tech	36.9	44.7	18.4	26.3	29.0	44.7	42.1	42.1	15.8	7.9	47.4	44.7	13.2	47.4	39.5	52.6	26.3	21.1	34.2	50.0	15.8	38
Tertiary	23.9	43.5	32.6	17.4	47.8	34.8	63.0	30.5	6.5	19.6	39.1	41.3	6.5	52.2	41.3	57.0	30.4	13.0	13.0	56.6	30.4	46
Occupation																						
Unemployed	38.4	43.4	18.2	26.5	39.2	34.3	37.0	48.3	14.7	23.7	40.6	35.7	11.9	39.1	49.0	50.3	32.9	16.8	53.1	39.2	7.7	143
Professional	23.5	45.1	31.4	21.6	35.3	43.1	51.0	39.2	9.8	9.8	47.1	43.1	7.9	49.0	43.1	52.9	29.4	17.7	29.4	31.4	39.2	51
Service	33.1	41.5	25.4	24.6	36.4	39.0	45.7	42.4	11.9	11.0	44.1	44.9	5.9	34.8	59.3	44.1	39.8	16.1	52.5	32.2	15.3	118
Agriculture	52.6	36.9	10.5	37.0	37.0	26.0	39.4	47.4	13.2	34.2	42.1	23.7	15.8	47.4	36.8	23.6	63.2	13.2	76.3	13.2	10.5	38
Religious class																						
Orthodox Xtian	33.7	42.7	23.6	24.1	36.7	39.2	44.2	41.7	14.1	16.6	45.7	37.7	8.5	41.2	50.3	46.2	38.7	15.1	46.2	37.7	16.1	199
Charismatic X	33.4	45.3	21.3	20.0	44.0	36.0	44.0	42.7	13.3	14.7	45.3	40.0	12.0	44.0	44.0	41.4	37.3	21.3	52.0	28.0	20.0	75
Islam	47.5	36.1	16.4	41.0	31.1	27.9	32.8	57.4	9.8	31.2	29.5	39.3	9.8	29.5	60.7	50.8	34.4	14.8	68.8	23.0	8.2	61
Other Religions	33.3	46.7	20.0	26.7	40.0	33.3	46.7	46.7	6.6	13.3	46.7	40.0	13.3	46.7	40.0	40.0	46.7	13.3	60.0	33.3	6.7	15

A - Perception of Timeline Acute/Chronic, B- Perception of Timeline Cyclical, C- Perception of Consequence, D- Perception of Personal Control, E- Perception of Treatment Control, F- Perception of Emotional Control, G- Perception of Coherence; L- Low; M-Moderate, H-High. *Source;* Field data, (2014)

In Table 4, 85 percent of the respondents showed low to moderate knowledge of hypertension. The results also indicate that 57 percent of the females, compared to 43 percent of the male patients had low picture of high blood pressure. Furthermore, 57 percent of the respondents between 40 and 49 years, and 54 percent of the divorced or widowed had low understanding of hypertension. Higher proportions of respondents with no formal education (75.9%), farmers (76.3%), and Muslims (68.8%) in particular, had low knowledge of hypertension (see Table 4). In general, the sample of patients in the study do not have clear understanding of the nature of hypertension.

Perceptions about the Causes of Hypertension

Causal factors refer to patients' personal ideas about the aetiology of the disease (Moss-Moris et al., 2002; Weinman et al., 1996). As discussed in Chapter Four, the causal construct is categorised under Psychological, Lifestyle, Immunity, and Chance or Accident factors. High scores indicate agreement with the concept.

The results in Table 5 indicate that 58 percent of the patients attribute hypertension to stress and worry, mental attitude (high perception, 38%), and family problems (high perception, 58%), as well as overwork (high perception, 38%). However, emotional state (moderate perception, 38%) and character or personality (low perception, 63%) were not considered important causes of high blood pressure. The results indicate that respondents generally attribute hypertension to psychological factors, especially stress, family problems, and mental challenges.

Table 6 relates the causal factors to patient background characteristics. In general eighty-three percent of the respondents showed moderate to high

attribution of hypertension to psychological factors, compared to 17 percent with low perceptions (see Table 6). While 46 percent of the females held moderate beliefs in psychological causes, 42 percent of the males held high perceptions. Half of the respondents between 50 and 59 years, 62 percent of those not married, and 50 percent of those with secondary education showed moderate perceptions. Furthermore, 49 percent of professionals, and 73 percent of persons in other religions also held moderate beliefs in psychological causes of high blood pressure.

Poor lifestyle involving high alcohol consumption, smoking, poor dietary habit, and physical inactivity may cause hypertension (WHO, 2012b). As shown in Table 5, 42 percent of the patients did not attribute hypertension to hereditary, neither to the effect of poor past medical care (low perception, 57.7%), alcohol intake (low perception, 42.9%), nor smoking (low perception, 40%). Furthermore, 40 percent of the respondents moderately attributed hypertension to their personal attitudes and ageing (40.3%). However, 41 percent held high attribution of hypertension to poor dietary practices. In general, respondents held low to moderate perceptions of the effects of alcohol and smoking on hypertension, but highly attributed the condition to poor dietary habit.

The results in Table 6 further show that 74 percent of the respondents held low to moderate attribution of hypertension to lifestyle factors. While 46 percent of the females showed moderate perceptions, 42 percent of the males held high perceptions about the influence of lifestyle on hypertension (see Table 6). However, 51 percent of those with no formal education, and 63 percent of the farmers did not attribute their condition to lifestyle factors.

Table 5: *Assessment of Psychological and Lifestyle Factors of Hypertension*

construct / Items	Perception		
	Low %	Moderate %	High %
Psychological causes (6)			
Hypertension is caused by my stress and worries	15.7	26.6	57.7
Hypertension is caused by my mental attitude	30.0	32.0	38.0
Hypertension is caused by my family problems	18.9	23.1	58.0
Hypertension is caused by overwork	26.9	38.0	35.1
Hypertension is caused by my emotional state	25.1	42.0	32.9
Hypertension is caused by my personality	63.1	26.3	10.6
Lifestyle factors (7)			
Hypertension is caused by hereditary	41.8	27.1	31.1
Hypertension is caused by diet or eating habit	20.6	38.8	40.6
Hypertension is caused by past poor medical care	57.7	29.2	13.1
Hypertension is caused by my own behaviour	39.4	40.0	20.6
Hypertension is caused by ageing	34.9	40.3	24.8
Hypertension is caused by alcohol	42.9	32.0	25.1
Hypertension caused by smoking habit	40.0	32.3	27.7
Immune system (3)			
Hypertension is caused by germ or virus	83.4	12.0	4.7
Hypertension is caused by environmental pollution	57.7	32.0	10.3
Hypertension is caused by poor immune system	65.3	22.0	12.7
Accidental factors (2)			
Hypertension is caused by chance or bad luck	54.6	32.0	13.4
Hypertension is caused by accident or injury	82.6	11.4	6.0

Sources: Field data (2014)

Immunity refers to the individual's immune system and its capacity to resist diseases. The construct refers to the perception that hypertension is caused by poor immunity as a result of virus infection and environmental pollution. As shown in Table 5, while 83 percent of the patients held low perceptions about the effects of germs or viruses, 58 percent held low perceptions about the effect of environmental pollution.

Further in Table 6, more than two-thirds of the participants did not attribute hypertension to poor immunity. Seventy-six percent of the female respondents, and 71 percent of males held low perceptions about the effect of poor immunity on hypertension. Additionally, 75 percent of those aged 40-49 years, 76 percent of those not married, and 78 percent of those with primary education held low perceptions of the immunity concept. Farmers (86.8%), Muslim (85.3%), and patients of other religions (86.7%) also held low perceptions about the effects of poor immunity. The results indicate that the sample of patients generally do not associate hypertension with weaknesses of the body's immune system or to germs and viruses.

The Accident construct refers to hypertension as a condition that occurs by accident or by mere chance. Seventy percent of the patients did not attribute hypertension to accidents or chance (see Table 6). Furthermore, 71 percent of the females, and 66 percent of the males held low perceptions that hypertension is caused by chance. Seventy-four percent of respondents between 70 and 90 years, 73 percent of those divorced/widowed, and 81 percent of those without formal education disagreed with the accident or chance notion. Based on the sample, it can be speculated that patients in the metropolis held a general view that hypertension is not caused by the effect of accident or chance.

Table 6: *Relationship between Socio-Demographic Factors and Perceived Causes of Hypertension*

Construct/Variable	Perception of Psychological Factors			Perception of Lifestyle Factors			Perception of Immunity			Perception of Accident or chance			TOTAL
	L	M	H	L	M	H	L	M	H	L	M	H %	
	%	%	%	%	%	%	%	%	%	%	%		
Total	16.6	43.4	40.0	32.9	41.4	25.7	74.3	21.4	4.3	69.7	25.4	4.9	350
Sex													
Female	15.5	45.5	39.0	38.6	40.4	21.0	75.9	18.5	5.6	71.2	24.0	4.8	233
Male	18.8	39.3	41.9	21.4	43.6	35.0	70.9	27.4	1.7	66.7	28.2	5.1	117
Age													
40-49	18.5	43.0	38.5	33.8	38.5	27.7	75.4	21.5	3.1	67.6	26.2	6.2	65
50-59	13.4	49.6	37.0	29.9	44.1	26.0	74.8	18.9	6.3	70.1	25.2	4.7	127
60-69	11.6	41.6	46.8	29.8	40.3	29.9	72.7	23.4	3.9	66.2	28.6	5.2	77
70-90	24.7	35.8	39.5	39.5	40.7	19.8	74.0	23.5	2.5	74.1	22.2	3.7	81
Marital Status													
Not married	20.7	62.1	17.2	27.6	55.2	17.2	75.9	24.1	0.0	62.1	34.5	3.4	29
Married	15.1	46.9	38.0	31.8	39.1	29.1	75.0	21.9	3.1	68.8	26.0	5.2	192
Divorced /	17.8	34.1	48.1	35.7	41.8	22.5	72.8	20.2	7.0	72.8	22.5	4.7	129
Widowed													

Table 6, continued

Educational status													
No formal education	25.3	42.2	32.5	51.8	33.7	14.5	73.5	20.5	6.0	80.7	18.1	1.2	83
Primary education	14.2	43.2	42.6	31.7	45.3	23.0	77.6	18.0	4.4	63.4	29.0	7.6	183
SSS / JHS / Voc / ch	7.9	50.0	42.1	15.8	21.1	63.2	60.5	34.2	5.3	76.3	21.1	2.6	38
Tertiary	17.4	41.3	43.3	17.4	56.5	26.1	73.9	26.1	0.0	69.5	28.4	2.1	46
Occupation													
Unemployed	16.8	39.9	43.4	31.4	42.7	25.9	72.7	23.1	4.2	70.6	25.2	4.2	143
Professional	15.7	49.0	35.3	17.6	56.9	25.5	70.6	29.4	0.0	72.5	21.6	5.9	51
Service	14.4	44.1	41.5	31.3	39.0	29.7	73.7	21.2	5.1	65.3	28.0	6.7	118
Agriculture /Fishing	23.7	47.4	28.9	63.1	23.7	13.2	86.8	5.3	7.9	76.3	23.7	0.0	38
Religious class													
Christian Orthodox	16.6	43.2	40.2	29.7	41.2	29.1	69.8	27.2	3.0	70.4	24.6	5.0	199
Charismatic Christian	14.7	41.3	44.0	33.3	44.0	22.7	74.7	18.7	6.6	58.7	36.0	5.3	75
Islam	19.7	39.3	41.0	41.0	39.3	19.7	85.3	9.8	4.9	80.3	14.8	4.9	61
Other Religions	13.3	73.4	13.3	40.0	40.0	20.0	86.7	6.7	6.6	73.3	26.7	0.0	15

L-Low, M-Moderate, H-High. Source: Field data (2014)

Misconceptions about Symptoms of Hypertension

Identity refers to the symptoms or signs that are used to identify the illness (Petrie et al., 2007). Hypertension is a symptomless condition, however some patients frequently point to specific symptoms (Horne et al., 2010). As explained in Chapter four, a list of nineteen frequently reported symptoms were presented to patients to identify those they have ever experienced. Patients were scored on "Yes" for experience with the symptom and "No" for no experience, and same for attributing a symptom to hypertension or to medication. A yes score was given a value of "1" and a no score a value of "0".

In order to measure misconception about symptoms, a three level perception index was developed with cut-offs showing "Low, Moderate and High" misconceptions. Since Hypertension is asymptomatic, the higher the number of symptoms identified by a patient the higher the level of misconception about symptoms of hypertension. A patient who identifies 1-6 symptoms is considered as having "Low" misconception, 7-12 symptoms represents "Moderate" misconception, and 13-19 symptoms as "High" misconception. Patients' level of misconception was determined by the counts of symptoms identified in the various categories of the index as expressed in percentage (see Table 7).

As presented in Table 7, there was a wide variation between symptoms that were attributed to hypertension and those to medication, with patients attributing more symptoms to hypertension. Overall, 92 percent of the patients held low to moderate misconceptions about symptoms of hypertension; with 58 percent showing low misconception of symptoms (1-6 symptoms), 34 percent with moderate misconception (7-12 symptoms) and 8 percent with high

misconceptions (see Table 7). Eighteen percent of the patients associated symptoms with medication. However, they held low misconceptions (1-6 symptoms), that is, not more than 6 symptoms were attributed to medication.

Over 50 percent of the patients held moderate misconception of ten (10) top reported symptoms which are body pain, breathlessness, weight loss, joint pains, upset stomach, dizziness, loss of strength, sexual weakness, feeling flush, and feeling of pins and needles. Furthermore, 63 percent of the male patients held low misconceptions about symptoms compared to female patients who showed low misconceptions (56.2%). Three symptoms that patients showed least misconceptions were fast heart beat or palpitation (43.9%), Fatigue (38.8%), and Headache (38.8%). Three other symptoms that attracted high misconceptions were sore throat, wheezing and stomach upset (Table 7).

Three symptoms that associated with high misconceptions among female patients were sore throat (37 percent), wheezing (36 percent), and loss of libido (32 percent). Contrarily, three symptoms that showed low misconceptions among female patients were fast heartbeat (45 percent), headache (36 percent), and fatigue (37 percent) as shown in table 7. Among the male patients symptoms with high misconceptions were nausea, weight loss, and feeling flush. Symptoms which associated with low misconceptions among male patients were fatigue, headache, sleep difficulties and fast heartbeat. There seems to be an agreement among male and female patients with respect to their expressions of low misconceptions about symptoms of fatigue, headache, and fast heartbeat (see Table 7).

Table 7: *Perceived Symptoms of Hypertension*

	Level of Misconception								
	Female (210)			Male (97)			Total (307)		
	L (1-6) %	M (7-12) %	H (13-18) %	L (1-6) %	M (7-12) %	H (13-18) %	L (1-6) %	M (7-12) %	H (13-18) %
Total	**56.2**	**35.7**	**8.1**	**62.9**	**28.9**	**8.2**	**58.3**	**33.6**	**8.1**
Body Pain	29.3	53.3	17.4	37.5	47.5	15.0	31.8	51.5	16.7
Sore Throat	22.2	40.7	37.0	35.3	29.4	35.3	27.3	36.4	36.4
Nausea	22.7	47.7	29.5	18.8	43.8	37.5	21.7	46.7	31.7
Breathlessness	27.1	55.3	17.6	40.0	40,0	20.0	30.0	51.8	18.2
Weight loss	16.3	65.3	18.4	25.0	45.0	30.0	18.8	59.4	21.7
Fatigue	36.7	50.0	13.3	43.6	43.6	12.7	38.8	48.1	31.1
Stiff Joints	30.5	53.3	16.2	37.8	44.4	17.8	32.7	50.7	16.6
Sore Eyes	26.8	46.4	26.8	30.8	50.0	19.2	28.0	47.6	24.4
Wheezing	22.7	40.9	36.4	42.8	28.6	28.6	27.6	37.9	34.5
Headache	36.2	51.7	12.1	45.5	38.6	15.9	38.8	48.1	13.1
Stomach Upset	15.4	56.4	28.2	11.8	47.1	41.2	14.3	53.6	32.1
Sleep Difficulties	32.6	51.2	16.3	41.9	41.9	16.2	35.7	48.1	16.3
Dizziness	28.1	53.9	18.0	28.1	53.1	18.8	28.1	53.7	18.2
Loss of Strength	28.3	55.6	16.2	33.3	50.0	16.7	29.9	53.7	16.3
Loss of Libido	29.0	38.7	32.3	44.4	41.7	13.9	37.3	40.3	22.4
Impotence	26.7	53.3	20.0	36.4	45.5	18.2	30.8	50.0	19.2
Feeling Flush	23.2	51.8	25.0	0.0	60.0	40.0	18.3	53.5	28.2
Fast Heart Beat	44.8	43.4	11.7	40.9	43.2	15.9	43.9	43.4	12.7
Pins and Needles	16.7	58.3	25.0	23.8	42.9	33.3	18.8	53.6	27.5

L- Low; M-Moderate; H-High

Source: Field data (2014)

Medication adherence and illness perceptions

The Chi-square model was used to assess associations between patient perceptions of hypertension and medication adherence, using medication adherence as the outcome variable. As discussed in chapter four medication adherence was coded as "1" for being adherent and "0" for non-adherent. The seven illness perception constructs were categorised into "Low, Moderate, and High" perceptions.

Table 8 presents the results of the Chi-square tests for significance between the seven illness perception constructs and patient medication adherence. The results in Table 8 show a statistical significant relationship between patients with the perception that hypertension is Cyclical and medication adherence. The Timeline Cyclical construct is statistically significant at X^2 (2) = 18.378, $p < 0.001$ indicating a significant relationship with medication adherence. Table 8 further reveals that except the Timeline Cyclical construct, there were no significant relationships between the other illness perception variables and medication adherence.

Table 9 assesses the strength, magnitude and effects of the significance of the Timeline Cyclical on medication adherence while controlling for gender. The result shows a weak (Crammer's = 0.229) but positive association between perceptions of the cyclical nature of hypertension and medication adherence, as based on the sample.

Table 8: *Analysis of Relationships between Illness Perception Concepts and Medication Adherence*

Variable	X^2	df.	p-value
Illness perception			
Timeline Acute	0.522	2	0.770
Timeline Cyclical	18.378	2	0.001
Consequence	0.157	2	0.924
Personal Control	2.223	2	0.329
Treatment Control	1.713	2	0.425
Emotional Control	5.096	2	0.078
Coherence	0.719	2	0.692

$p < 0.001$

a. *0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.50.*
b. *0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.57.*
c. *0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.92*

Source: Field data, (2014)

Inspection of the Standardised Residual values as presented in Table 9, indicates that respondents with low perceptions of the cyclical nature of hypertension contributed significantly to the expected effect (Std. Residual = 3.0). However, patients with high perceptions of Timeline Cyclical contributed significantly less than expected (standardised residual = -2.3).

The results (Table 9) further show a significant statistical association between perception of Timeline Cyclical and medication adherence when controlling for gender (X^2=11.6 and 7.027 for female and male respectively). Therefore, gender explains the statistical relationship between perceptions of the cyclical nature of hypertension and medication adherence in the sample. Based on the sample, female

patients contributed more to the significant effect and that female patients with low perceptions of the cyclical nature of hypertension contributed more to the expected effect (Std. residual = 2.3). Therefore female patients with low perceptions of the cyclical nature of hypertension were more likely to be adherent to their medication. However, female patients with high perceptions of the construct were less likely to be adherent to medication (Std. residual = -2.0) as shown in Table 9.

Table 9: *Assessment of Strength, Direction and Effects of Timeline Cyclical Perception on Adherence*

Test type	Overall Statistic	Female	Male
X^2	18.378	11.6	7.027
df	2	2	2
p-value	0.001	0.003	0.03
Phi	0.229	0.223	0.245
Cramer's	0.229	0.223	0.245
Standardised Residual			
Low perception	3.0	2.3	-
Moderate perception	-	-	-
High perception	-2.3	-2.0	-

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.50.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.57.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.92
d. Std. residual is significant at ±1.96, P< 0.05

Source: Field Data, (2014)

Experiences with Hypertension

This section discusses results of the in-depth interviews which were conducted to assess participants' lived experiences with the management of hypertension, challenges, and adjustments made to cope

with such challenges. The aim was to obtain a deeper understanding of their perceptions, attitude, and the skills acquired to maintain adherence. Eight purposively selected respondents from the list of patients in the baseline study (stage I of the study) were interviewed using a semi-structured questionnaire.

The eight selected respondents were made of four adherents with MMAS score of eight and four non-adherents with a MMAS score less than eight. Four males (two adherents, and two non-adherents) as well as four females (two adherents, and two non-adherents) were selected. Seven participants were between 40 and 70 years and one above 70 years, two with senior secondary education, and six with primary education. The questions were structured to elicit participants' views about the issues which include diagnosis, symptoms, causes, experiences, and challenges with treatment.

Tape recordings of the data were first transcribed by an independent analyst before the investigator reconciled them with the manual recordings. The issues were categorised into distinct themes which were derived from the literature. They were perceptions about symptoms, treatment, and lifestyle modifications. The responses were then organised in tables by the themes and topics, showing responses of the adherent and non-adherent by sex and age. The data was manually analysed. Responses that showed similar ideas were identified under each topic for both the adherent and the non-adherent patient. Implications and conclusions were then drawn from the findings.

Views about diagnosis and causes of hypertension

Patients sometimes conceive ideas about their illnesses through personal experiences with symptoms, information obtained from family members, friends, media adverts as well as health personnel (Petrie & Weinman, 2012, 2006). All eight participants first became aware of their condition at the hospitals. This is consistent with results of the quantitative survey which showed that 95 percent of the respondents were first diagnosed at the hospitals (see appendix C). The results further indicate that both the adherent and the non-adherent participants were unaware of the disease until they were told at the hospitals. The narrations of some adherent participants seem to confirm this claim:

> I used to feel tired after short work or walk, even after visiting the washroom. I went to see the doctor, and was told I had hypertension (adherent: male, 55);

A second adherent participant was also informed about the condition at the hospital:

> I felt ill and reported to the hospital. The doctor told me that, I had hypertension (adherent; male, 56);

Other non-adherent patients corroborated, and according to a 53 year old male non-adherent he was diagnosed at the hospital:

> It was identified at the hospital and the doctor advised me to stop alcohol or risk dying early (non-adherent, male, 53);

A female non-adherent narrated her first experience with hypertension in the following lines:

> I used to experience dizziness, frequently felt tired and light. I visited the hospital and was told I had hypertension (non-adherent, female, 61).

According to the Leventhal's Self-Regulatory Model (Leventhal H., Leventhal, E.A., Contrada, R.J. 1998), patients are expected to be told about the causes of their illnesses by health professionals. Both the adherent and the non-adherent participants attributed their high blood pressure principally to alcohol use and psychologically related problems such as worries, financial constraints, marital problems, hereditary, and sexual weaknesses.

A female adherent patient attributed her condition to negative lifestyle practices and also to inheritance:

> I believe my condition was caused by alcohol, and poor diet. Besides, some of my family members have it, so it is also by hereditary (adherent, female, 47);

A male adherent patient also attributed his condition to psychological factors and poor lifestyle as shown in the following narration:

> I use to drink alcohol without eating. I had a dispute on my land, this caused my worry, fears and the high blood pressure (adherent, male, 55);

Another female adherent attributed her condition to psychological factors and financial challenges:

> I believe my hypertension was caused by deep worries after my husband died. Paying my children's school bills became difficult for me (adherent, female, 50).

Similar claims were expressed by the non-adherent participants. Worries about sexual weaknesses, stress, and marital problems translated into alcoholism, as the following statement by a female non-adherent patient suggests:

> I had marital problems, and my husband beat me frequently, and that caused me to drink much alcohol (non-adherent, female, 61);

A male non-adherent patient also attributed hypertension to alcohol use due to his worries about sexual weakness:

> *I believe alcohol is the main cause of my hypertension. The doctor told me to avoid worries about my weak sexual potency (non-adherent, male, 53);*

Also shown in Appendix C of the results of the quantitative data, psychological and lifestyle factors were found to be the main causes of hypertension among the patients. Similar factors such as marital problems, poor eating habit, worries or stress, alcohol, as well as perceived inherited hypertension were reported. Further in Tables 4 and 5, 83 percent of the patients showed moderate to high beliefs in psychologically related causes such as stress, worries, mental and family problems.

Perceived symptoms of hypertension

Symptoms identified by participants include dizziness, tiredness (fatigue), severe headache, and body weaknesses. There were indications that some patients sought medical care when perceived symptoms became severe. Perceived appearances of symptoms were also regarded

as indications of rising blood pressure. These perceptions were made by both the adherent and non-adherent patients as shown in the following narrations. A female adherent complained about fast heartbeat, pain and headache:

> I experience fast heartbeat, pain under the foot, and headache (adherent, female, 50);

A male adherent also experienced similar symptoms:

> I experience severe headache, loss of libido and fatigue after short walk or work (adherent, male, 55).

Similar complaints were made by non-adherent patients. A male non-adherent reported tiredness, and headache, perceiving the symptoms as indications of rising blood pressure:

> Tiredness after short work, fears and headache. When my blood pressure is rising, I experience severe headache (non-adherent: male, 53);

A female non-adherent on her part had experiences with fast heartbeat or palpitation, sleeplessness, and body heat:

> I experience fast heartbeat, difficulty sleeping, and body heat (non-adherent: female, 56);

Patients could detect high blood pressure using the presence of perceived symptoms they regularly experienced. Symptoms such as continuous cough, loss of libido, difficulty sleeping, fast heartbeat, restlessness, body weakness and body heat were strong indicators of high blood pressure as reported by both adherents and non-adherents. Similar symptoms were reported in Table 7 of the quantitative survey. According

to the two category of patients, these symptoms were not noticed until they were diagnosed of hypertension, suggesting that sudden occurrence of these symptoms were indications of rise in blood pressure. The following are narrations by both adherents and non-adherents to support their beliefs in appearance of symptoms:

A female adherent associated appearance of symptoms with hypertension, arguing that her symptoms were not experienced until she was told of the condition, as stated in the following narration:

> When I had no high blood pressure, those symptoms were not observed. It is after I was told that, I observed them (adherent: female, 50);

A male adherent also linked occurrence of symptoms to hypertension as expressed in the following narration:

> I did not experience the symptoms until I was told I had hypertension (adherent, male, 55.

A non-adherent participant corroborates the notion of symptoms and hypertension:

> I was not experiencing those symptoms until I was diagnosed (non-adherent: male, 44);

Coping with Symptoms

Both adherents and non-adherents used various remedies to control perceived appearance of symptoms. While some visit the hospital to seek treatment, others simply repeat the dose, or take herbal preparations. For example, some adherents were found to repeat doses of the medication in order to control symptoms, others simply took rest

(apparent stress) with the aim of stabilising blood pressure. Some non-adherents on the other hand complemented the medication with herbal preparations.

In the following narration, a female adherent patient repeats the dose whenever she perceived symptoms:

> When I experience restlessness or sleep difficulty, I repeat the medication even when I had taken some (adherent: female, 47*);*

A second female adherent participant took some time to rest with the assumption of controlling stress as she explains:

> When I experience headache, I bow my head on the table and take rest until it stops (adherent: female, 50);

In contrast, a number of the non-adherent patients took their medications together with herbal supplements when they experienced symptoms. A 44 year old non-adherent for instant said:

> When the symptoms occur, I take my prescription, as well as herbal preparations to control the headache and fast heart beat (non-adherent: male, 44);

Furthermore, other non-adherents intentionally did not take medication but prefer to rest until the symptom stops as reported by a 56 year old non-adherent:

> I sit down quietly when I experience the symptoms. I don't take any medicine (non-adherent, female, 56).

Experiences with episodes

There were perceptions of sudden occurrences of severe symptoms, which sometimes led to complications and hospital admission. Participants had experiences with incidents of severe headaches, dizziness, and breathlessness which led to unconscious state. The results showed that patients who adhered to treatment (adherents) did not frequently experience crisis, compared to those who did not adhere to medication (non-adherents). A non-adherent male patient narrated in the following statement how he ended at the admission ward:

> I experienced difficulty breathing, and severe headache. I suddenly became helpless and was rushed to the hospital without the knowledge of my wife. I was admitted at the hospital (non-adherent, male 44);

A second non-adherent 61 year old female patient was rushed to the hospital after she felt dizzy:

> I don't remember what happened to me, but I realised I was not myself at the time. I experienced dizziness and heat. I was rushed to the hospital and admitted. The nurse checked on me every two hours (non-adherent: female, 61).

Perceived triggers of hypertensive episodes

The results point to differences between the adherents and the non-adherents regarding triggers of episodes of high blood pressure. The four adherent patients did not complain about episodes or perceived occurrence of sudden rise in pressure, and were not aware of triggers.

In the case of a non-adherent participant, alcohol was discovered to be a major trigger of high blood pressure as said in the following statements:

> I took much alcohol at the time the crisis occurred (non-adherent: male 53);

A 61 year old female non-adherent patient believed her worries about limited funds triggered the perceived rise in blood pressure:

> I believe it was triggered by my worries. I was worried about how to find money to settle the school bills of my children (non-adherent: female 61).

Furthermore, non-adherent patients seem to be more affected by episodes, leading to hospital admissions than the adherents. A non-adherent male was admitted as illustrated by the following statement:

> I was admitted at the hospital, the doctor advised me to avoid anger. I also took herbal preparation called "adom Koo" (non-adherent: male, 53);

A female non-adherent was also admitted at hospital on account of severe anger as indicated in the following narration:

> *I was stabilised and discharged from the hospital after three days, and was told to avoid anger (non-adherent: female, 61)*

Experiences with Treatment

Participants were found to have engaged in various forms of therapies including orthodox medicines, lifestyle modifications, and herbal preparations. While some participants observed dietary practices

such as reduced salt intake and low fat diet, others preferred herbal preparations.

Both adherents and non-adherents observed therapy differently. Participants who remained adherent kept faith with their anti-hypertensive medicines and observed diet modifications as said by a 50 year female adherent patient:

> I take only hospital treatment (adherent, female, 50).

A 56 year male adherent made effort to observe dietary control as said in the following statement:

> I avoid fatty meat, but eat only dry meat. I eat less salt (adherent, male, 56);

Furthermore, patients who were adherent to treatment were careful about the likely complications of hypertension and therefore remained faithful to the anti-hypertensive medication. A male adherent fears complications as said in the following statement:

> I need to take the drugs to avoid problems (adherent, male, 55);

A 50 year old female adherent also had faith in the medication:

> The drugs help control my blood pressure (adherent, female, 50).

In contrast, some non-adherents showed preference for herbal preparations. The Chinese and the local herbal preparations were sources of strength for some of the non-adherents as explained by a 44 year old male non-adherent patient:

The local herbal medicine and the Chinese herbs make me strong (non-adherent, male, 44).

On benefits of treatment, patients who were found to be adherent claimed that the medicines were effective, relieved pain, and restored their health as demonstrated in the following lines:

The drugs are necessary, they have helped restore my energy (adherent, male, 55);

A female adherent participant corroborated this view:

The pills have helped subside my head pain. The drugs are necessary, I should have died (adherent, female, 47).

Concerns about side effects of anti-hypertensive

Complaints of side effects of medicines were raised among participants. The results showed that some adherents and non-adherents received prior information about possible side effects of the anti-hypertensive. A 55 year old male adherent patient had prior information about the side effects of the medicine:

I was told the medicine causes cough (adherent: male, 55).

A female non-adherent was also informed about the adverse effect of the medicines:

I was told by the nurse that the drug induces frequent urination (non-adherent: female, 61).

Non-adherents in particular, raised concerns about symptoms of sexual weaknesses, fast heartbeat, insomnia, cough, and stomach upset, attributing these to the anti-hypertensive use. Perception of side effects

of medicines might have led to patient preference and use of herbal preparations. A non-adherent patient gave reasons for not adhering to medication, and defended his preference for herbs in the following statement:

> When I take the pills I experience sexual weakness, finds it difficult to sleep. I am also worried about taking hospital medicine every day. So I don't take the hospital's pills always. The local and Chinese herbs make me potent and strong (non-adherent, male, 53);

A second male non-adherent corroborated the perception of sexual weaknesses resulting from anti-hypertensive use as in the following narration:

> I experience sexual weakness when I take hospital pills. Honestly, I do sometimes avoid the hospital drugs. There are chemicals in the medicines, it gives side effects. I am also a diabetic, and taking additional drugs makes me angry (non-adherent, male, 44);

It is evident that perceptions of sexual weaknesses due to anti-hypertensive use was a key factor for non-adherence behaviour among the hypertensive patients: A 53 year old male argues as follows:

> I was sexually active, but after taking the pills for some time, I realised the effect (non-adherent: male, 53).

Other non-adherents simply stopped medication when they felt better (intentional non-adherence), as illustrated by the following comments from a female non-adherent patient:

When I take the pills and become normal, then I stop for some time (non-adherent, female, 61).

Patients who were found to be adherent prefer the anti-hypertensive medication and did not frequently report side effects,

I have not experienced any adverse effect of the drugs (adherent, male, 56);

Except for a 55 year old male adherent whose drug was changed:

One drug made me cough for about one month until it was changed (adherent, male, 55);

Facilitators and barriers of medication adherence

There were certain factors which facilitated increased adherence among the patients who were found to be adherent to medication. In contrast, those patients who were non-adherents also showed evidences of inhibitors of medication adherence. Some of the patients who attained high levels of adherence achieved it through counselling, believe in effectiveness of the medicines, fear of complications and fear of death.

In the following narration, a 56 year old male adherent patient got inspiration from media counselling sessions:

I listen to counselling on television that if I don't take the pills, it could affect my life (adherent: male, 56);

A 55 year old male adherent believe in the effectiveness of medication as expressed in the following statement:

I realised the drugs made me fit and strong, so I decided not to stop taking my pills (adherent: male, 55);

The fear of complications and death influences a female adherent patient as narrated in the following lines:

> I was advised not to stop taking the pills even one day else, I could develop complications. Besides, I know of a man who refused to comply with treatment and died (adherent: female, 50).

Sexual weakness, forgetfulness, fears of addiction, and intentionally ignoring medication were the key factors of non-adherence behaviour among the participants of this study. Similar factors including cost of medication, adverse drug effects, and forgetfulness have been identified elsewhere as barriers to patient adherence behaviour (Krousel-Wood et al., 2009). A male non-adherent complained about fears of getting sexually weak from continuous use of anti-hypertensive and his difficulty with daily intake of medicines:

> I have difficulty taking the pills every day. Besides, I experience sexual weakness after taking the medication for some days (non-adherent: male, 44).

A second male non-adherent patient was concerned about sexual weaknesses perceived to be related to side effects of the medication

> I experience sexual weakness after taking the pills for some time, and that is making it difficult for me to continue (non-adherent, male, 53).

Other non-adherents intentionally discontinued medication when they felt better, suggesting that some patients have high beliefs in the cyclical concept of hypertension, and might only take medication when perceived

symptoms appear. As the symptoms subside, they cease medication as said in the following statement by a non-adherent:

> I have no difficulty taking the pills, but I stop taking them when I feel better (non-adherent: female, 61).

Forgetfulness is a key barrier to adherence. Some patients sometimes forget to take their medications. A female non-adherent patient complained deeply about forgetfulness, and regards the behaviour as a disease because she even forgets sometimes to eat:

> I easily forget things, at times, I forget to even eat. I am also upset with taking the pills every day. Besides, I experience sexual weaknesses after taking the pills for some days. This is making it difficult for me to continue with the treatment (non-adherent: female, 56).

Affordability in terms of cost of medication is a known barrier to adherence (Krousel-Wood et al., 2009). A participant could not afford to buy medicines allegedly meant to control forgetfulness:

> I have difficulty taking my pills regularly, because I sometimes forget. I was told by the health staff to buy a certain medicine at GHC150.00 to control forgetfulness, but I could not afford it (non-adherent: female, 56).

Coping with treatment

Coping is described as changing the cognitive and behavioural efforts to manage specific stressful demands (Ward & Heidrich, 2009). Both adherents and non-adherents designed strategies, including customised reminder systems to cope with medication. For instance, a 56

year old male adherent who frequently forgot to take his medicines described how he overcame forgetfulness in the following narration:

> I used to forget my medicines, but now I have always placed my medicines in the basket containing my cutlery which is also on my dining table. This serves as a reminder, so after breakfast, I quickly take the medicines (adherent: male, 56);

In the following scenario, a female non-adherent participant narrated how She addressed forgetfulness through a strategy she has conceived using her cosmetic bag:

> I have now placed my medicines in my cosmetic bag. When I take my bath and proceed to dress, I see the medicines, and that reminds me to take them. I do not forget to take my medicines any more (non-adherent: female, 61)

Experiences with Lifestyle Modifications

Addressing behavioural risks factors such as reduced alcohol use, cessation of smoking, reduced salt intake, increased level of physical exercise, and changes in diet may enhance blood pressure control efforts (Shimamoto et al, 2014, WHO, 2013). The concept of adherence requires doctors to provide information to patients about appropriate behaviour changes to enhance blood pressure control according to the Self-Regulatory Model. It is evident from the following statements that both adherents and non-adherents were counselled to adhere to lifestyle

practices such as increased fruit intake, reduced alcohol use, sufficient rest, and increased physical exercise.

An adherent patient received instructions on alcohol and exercise as told by a 55 year old male patient:

> I was told by the Nurse to avoid alcohol (adherent: male, 55);

A 47 year old female patient who was found to be adherent collaborated this claim:

> I was told by the Nurse to do moderate exercise, and avoid fatty food (adherent: female, 47)

Non-adherent patients were also instructed on appropriate lifestyle changes as corroborated by a 44 year old patient in the following statement:

> I was advised to take fruits and vegetables regularly (non-adherent: male, 44);

A 56 year old female non-adherent was counselled to reduce intake of salt and avoid late dinner:

> I was told by the nurse to avoid hard work, and anger, reduce salt intake, and avoid eating late in the night (non-adherent: female, 56).

Challenges with Lifestyle Modifications

Both adherent and non-adherent patients were found to have encountered various forms of challenges with lifestyle changes. Some of the patients were not able to maintain the changes they embarked on for

various reasons including lack of interest, lack of energy, resistance from friends, and physical challenges.

A 56 year adherent expressed how lack of interest affected his ability to keep to exercise schedules in the following narration:

> I am not able to keep doing the exercise prescribed for me because I am no more interested (adherent: male, 56).

Some patients were not capable of observing dietary control measures because that may be the only food available to them. A 53 year old non-adherent explained his challenge in the following statements:

> *I was told to avoid oily food, groundnut and palm oil, but it is difficult for me to do. Sometimes I eat them because, that is what I have. Besides, I was told to avoid eating late, but that is difficult because my wife prepares the meal late in the evening (non-adherent: male, 53).*

Lack of support and peer pressure may affect patients' efforts at adhering to lifestyle changes. A 44 year old non-adherent expressed how peer pressure affected his efforts at maintaining recommended lifestyle changes in the following:

> My friends tease at me for stopping alcohol and refusing to go out with them (non-adherent, male 44).

Coping with lifestyle changes

When patients face challenges with lifestyle modifications, they are likely to acquire skills to overcome such challenges. Both the adherents and the non-adherents adopted skills to adhere to expected lifestyle changes. Following fitness exercise sessions on television, belief

in prayer, and lessons learnt from negative experiences of life events, were identified as interventions among both adherents and non-adherents.

A 56 year male adherent explained how his personal encounter with the death of a friend helped change his behaviour towards medication, as narrated:

> I witnessed the sudden collapse and death of a friend, as we walked together. I was told he died of hypertension, this has frightened me into observing treatment (adherent: male, 56);

A 47 year old female adherent planned his aerobic exercise sessions alongside what is shown on television:

> I watch aerobic sessions on television every morning and follow what they do, the exercise keeps me healthy (adherent: female, 47).

A 55 year male non-adherent patient was delivered by the power of prayer which enabled him control alcohol as he explains in the following narration:

> It happened when I was drunk one early morning. A certain lady met me and started praying for me. Since then I do not take alcohol again. Besides, the doctor had told me to stop alcohol or die. I believe the prayer delivered me (non-adherent: male, 53).

Patients' Suggestions for improved Adherence

There were suggestions by both adherents and non-adherents for improvement in medication adherence. It appears the non-adherents were not satisfied with the prescribed generic anti-hypertensive, and were willing to bear the cost of perceived effective and expensive medicines. A 61 year old female non-adherent expressed her opinion on what her doctor frequently prescribed in the following way:

> My doctor always gives me Nefidipine, but he should vary the medicine or ask us to buy better medicines (non-adherent: female, 61);

Intensification of education as well as awareness about hypertension was suggested. A female non-adherent patient suggested in the following narration that:

> The doctor should give us information about hypertension (non-adherent: female, 56);

A 50 year female adherent patient also advocated increased awareness about hypertension as she stated:

> Doctors come to my church to give talks about hypertension. I think they should intensify awareness about the disease (adherent; female, 50).

A 56 year old female non-adherent promotes visibility of medicines as a solution to forgetfulness. Making medicines visible at places where she visits regularly is helping her improve adherence, as she advises:

> Tell women to place their pills in their cosmetic baskets. Women cherish their basket collection of powder,

pomade, comb, make-up, and others. So placing your pills in such a basket makes you see them, as I have now learnt (non-adherent: female, 56).

Non-adherents were found to have faith in herbal preparations and would want herbs to be prescribed. A 41 year old male non-adherent advocated herbal use in the following statement:

> Promote herbal products for the treatment of hypertension. The herbalist told me he does not make his product public because he has no money to register (non-adherent, male, 44).

Discussion

The chapter explored perceptions of hypertension, and the extent to which these perceptions affect medication adherence among the patients. This was done using the Self-regulatory Framework as a guide. The Self-Regulatory model of health behaviour posits that patients have lay beliefs about diseases which may be at variance with medically accepted knowledge (Horne et al, 2010; Leventhal, et al. 1998). Therefore, the discussion focuses on the differences between patients' beliefs and the medical model of hypertension as required at the interpretation or explanatory stage of the conceptual framework of the study.

The first section of the discussion focuses on perceptions of the constructs of the illness representations regarding Timeline Acute or chronic. Timeline Cyclical, Consequence, Personal Control, Treatment Control, Emotional Control, as well as Coherence and Medication

Adherence. The second section of the discussion is centred on the results of the qualitative study regarding participants' experiences with the management of hypertension as based on the three main themes: perceptions of hypertension, experiences with treatment, and experiences with lifestyle modifications.

Based on the sample, the only construct of the Illness Perception Model which attained significant association with medication adherence in the sample is Timeline Cyclical, with $\chi 2\ (2) = 18.378$, $p < 0.001$ (see Table 8). Further analysis in Table 9 indicates that patients with low perceptions that hypertension is periodic have positive significance (Std. Res. 3.0) and those with high perceptions about the periodic occurrence of hypertension have negative significance (-2.3). Additionally, patients with low perceptions of the concept have more significant effect than those with high perceptions of it. Therefore, adherence is expected to improve with perceptions that hypertension is quite stable (low perceptions). The finding compares with a study by Chen et al. (2009) who initially showed negative association between the cyclical nature of hypertension and medication adherence in Thailand, but failed to yield significance with further multivariate analysis (Kucukarslan et al., 2012; Chen et al.).

Timeline cyclical is associated with beliefs about fluctuations in symptoms (Hagger, & Obell, 2005). The perception that hypertension is cyclical means it is occasioned with heightened blood pressure sometimes, but with lower blood pressure at other times. Where patients

perceive hypertension to be cyclical they might avoid medication during the interval they perceive it to be stable (Ross et al., 2004).

The interpretation stage of the conceptual framework of the study requires healthcare providers to explain the nature of hypertension to patients to address the misconception that hypertension occurs on-and-off. It is evident from the finding that patients lacked sufficient understanding about the behaviour of hypertension since more than 70 percent of the respondents hold moderate to high beliefs that hypertension comes and goes in cycle (see Table 3 and 4). Furthermore, the significant association between the cyclical concept and medication adherence in the sample did not lead to improved adherence, since only a quarter of the patients in this study were adherent.

Except the timeline cyclical construct, the other illness perception constructs including timeline acute, consequence, personal control, treatment control, emotional control, and coherence did not significantly associate with medication adherence in the sample. Timeline acute or chronic did not significantly associate with medication adherence. However, more than two-thirds of the respondents held low to moderate perceptions of the concept, indicating the notion that hypertension is an acute illness and treatable in a short time (see Table 4). Beliefs that hypertension could be treated in a short duration have been shown to negatively affect adherence. For example, a study by Leventhal, et al.(1998), found that 58 percent of the patients with beliefs in timeline acute dropped out of treatment, compared to 17 percent of those who perceived hypertension as chronic.

Further studies have shown that patients with beliefs in curability of chronic conditions are usually more likely to abandon their treatments in search for alternate care (Petrie & Weinman, 2006). This might have contributed to the use of alternate medicines among 20 percent of the respondents (see Appendix D). As shown by results of the qualitative survey, some participants showed preferences for herbal preparations with the view to cure hypertension. The suggestion that hypertension is curable does not support the general medical knowledge which labels hypertension as chronic and controllable through the use of medicines rather than cure (Horne et al., 2010). Though not significant, the finding gives an indication that patients are not adequately educated about the chronicity of hypertension as required by the interpretation stage of the conceptual framework of the study. This calls for intensification of public education as well as patient education during consultation.

At least, 80 percent of the patients held low to moderate perceptions about the negative consequences of hypertension (see Tables 3 & 4). The moderate score on illness consequence in the sample shows that patients are less concerned about the negative effects or threat of hypertension. Though consequence did not significantly associate with adherence (Table 8), Rose et al. (2004) found that patients who show low consequence or concerns about their illnesses are more likely to adhere to treatment compared to those with high perceptions of consequence (Kucukarslan et al., 2012; Ross et al., 2004). In another study involving asthmatics, Horne and Weinman (2002) found a significant but negative relationship between high consequence beliefs and medication

adherence, indicating that patients with higher consequence perceptions were associated with lower adherence. This suggests that patients who are less fearful about the consequences of the disease are better adherents. Horne & Weinman attributed their finding to the years of experience of the illness and level of personal control beliefs patients might have gained.

The expectation is that 87 percent of the respondents who held low to moderate perceptions about the complications associated with hypertension might have been adherent to medication (Table 4). However, their perceptions did not translate into high levels of medication adherence as it had no significance (see Table 8). Nonetheless, hypertension is known to cause serious complications, including stroke and organ damages which may lead to hospital admission as well as sudden death (WHO, 2014a, 2013; Addo et al., 2009). Therefore, there is need to intensify patient education about the complications of hypertension with emphasis on medication adherence.

Beliefs in personal effort at controlling blood pressure as against treatment did not significantly associate with adherence in this study (see Table 8). However, more than two-thirds of the respondents held moderate to high beliefs in their personal control abilities (moderate: 42.9%; high: 38.6%) as shown in Table 3. Ross et al. (2004) showed that higher personal control abilities associate with lower adherence. This indicates that patients who feel they could personally control their hypertension are less likely to be adherent to medication. According to the medical model, hypertension is treatable with medication, therefore,

it could be inferred that patients' inclination to higher personal control abilities might have contributed to the low medication adherence rates in this sample. This might explain why the non-adherents participants showed preferences for herbal preparations as reported by the qualitative survey.

Ninety percent of the patients held moderate to high perceptions of treatment control (moderate: 40%, high: 50.3%) though the variable was not significant (see Tables 4 and 8). There is evidence to suggest that faith in medicines improves adherence to treatment (Lo, Chau, Woo, Thompson, Choi, 2016; Horne et al., 2013; Z˘ugelj et al., 2010). A study in Taiwan found that patients with high beliefs in the effectiveness of their medications were more likely to adhere to treatment (Chen et al 2011; 2009). Adolescent hypertensive patients in Slovania who showed high beliefs in treatment control were found to have increased adherence to treatment (Z˘ugelj, et al.). Further, Lo et al. (2016) associated increased odds of medication adherence to patients with high perceptions of treatment control. Though their treatment beliefs were consistent with the medical model of hypertension, which postulates that hypertension is a chronic condition which is treatable with medicines (Horne et al.), the finding of this study suggests that faith in treatment does not necessarily translate into higher adherence as expected.

More than three-quarters (88%) of the patients showed low to moderate emotions about their condition (Table 4). This means that the patients were emotionally stable, indicating a high tendency to adhere to treatment. There is evidence to show that less emotional concerns

improve adherence among hypertensive patients (Zˇugelj, et al 2010; Chen et al., 2009; Ross et al., 2004). Though the patients' emotional stability was expected to result in high levels of adherence, the variable did not significantly associate with medication adherence (Table 8).

At least, 50 percent of the patients held lower perceptions of coherence, which means half of the patients poorly understand hypertension (see Table 3 & 4). As shown in appendix C of the quantitative survey, more than 60 percent of the respondents could not mention the values of normal blood pressure. While 15 percent erroneously related hypertension to excess blood volume, 56 percent could not explain hypertension, and 58 percent did not know the causes or risk factors of hypertension. The lack of coherence about hypertension has been reported among hypertensive patients in Ghana by Spencer et al. (2005), where hypertension was referred to as excess blood. In another study to assess illness perceptions among diabetes patients, the score for illness coherence was found to be low, indicating that patients have poor understanding of diabetes (Searle et al., 2007). The findings suggest that patients' beliefs regarding the causes and risk of hypertension are not consistent with the medical view, indicating poor education contrary to the conceptual framework. This might have contributed to the low adherence rate in the sample.

Over eighty percent (84%) of the participants held moderate to high attribution of hypertension to psychological factors, but 74 percent with low to moderate attribution to lifestyle risk factors (see Tables 6). With regards to psychological causes, the main concerns of patients were

stress and worries (57 percent), and family problems (58%) as in Table 5. On the other hand, more than two-thirds (78%) of the patients held low to moderate perceptions about the effect of lifestyle on high blood pressure (see Table 6). Among the causal lifestyle factors, 40 percent of the respondents moderately attributed hypertension to diet and poor eating habits, and 40 percent each with moderate perception of ageing and personal behaviour respectively (see Table 5). The findings are consistent with Aikins et al. (2012) that Ghanaians strongly attribute hypertension to stress, fear, and "over thinking". Furthermore, Marshall et al. (2012) observed that patients attribute hypertension to stress.

Contrary to medical views, the results indicate that patients do not regard ageing, alcohol intake, and smoking as important risk factors of hypertension (see Table 5). However, the qualitative survey points out strongly that alcohol, poor diet, worry, marital problems, and financial challenges affect patients' adherence behaviour. The issues imply that the interpretation of hypertension is not being adequately done as expected of the conceptual framework.

Attribution of hypertension to stress, fear, and spiritualism have been associated with poor medication adherence because of the tendency to seek alternate care (Kretchy, 2014c; Marshall et al., 2012; Aikins et al., 2012). Chen et al. (2009) found that patients with less causal attribution of hypertension to psychological factors are more likely to be adherent, and those with strongly held beliefs in the lifestyle causes are also more likely to be adherent. Attribution of specific lifestyle factors to hypertension gives an indication that patients can influence blood

pressure control by adhering to specific lifestyle behaviour. According to Petrie & Weinman. (2006), causal beliefs can influence the type of treatment or changes that patients make in their behaviours. In Ghana, for example, patients who are more likely to attribute their illnesses to spiritual causes (psychological) would normally seek care from spiritualists as the first option (Kretchy). The implication of the moderate perceptions of causal factors in this sample suggests the need to reduce patients' perception of psychological factors and raise their beliefs in lifestyle factors in order to improve adherence.

Patients strongly disagreed with the notion that germs or viruses, pollution, accident, chance and poor immunity were among the causes of hypertension. The result showed consistency with Jessop and Rutter (2003) who found no association between chance, germs, pollution causes and medication adherence among asthma patients. Though, this study agrees with Chen et al. (2009) that these factors have no relationship with the causes of hypertension, the construct provided information about the level of misconception regarding risk factors of hypertension.

A wide range of symptoms such as body pain, headache, fatigue, fast heart-beat, stiffness of joints, dizziness, and difficult with sleep were identified with hypertension (Table 7). Furthermore, there was a high attribution of symptoms to hypertension than to effect of medication. Lo et al. (2016) and Horne et al. (2010) have reported similar symptoms among hypertensive patients. However, Granados-Gámez et al. (2015)

observes that associating symptoms with hypertension could affect medication adherence.

Though patients held low to moderate misconceptions of symptoms, their beliefs are inconsistent with medical knowledge which declares hypertension as symptomless (Horne et al. 2010). However, the result agrees with the Self-regulatory Theory that patients assign symptoms to hypertension just to make sense of the condition (Horne et al.; Petrie & Weinman 2006). Therefore, the strong attribution of the range of symptoms as found in the study is a reflection of patient' perceptions that high blood pressure occurs intermittently (see Table 3 & 5). As explained by Granados-Gámez et al. (2015), patients perceive the absence of symptoms to mean that their blood pressure is normal and may stop medication. As found in the qualitative survey, some of the participants would only seek care when perceived symptoms were severe. The implication is that beliefs in the appearance of symptoms might have contributed to the low levels of medication adherence in the sample.

Patients' views about the appearance or absence of symptoms cannot also be totally ignored because symptoms, including dizziness, headache, palpitation, and breathlessness are frequent complaints among high blood pressure patients (Marshall et al. 2012; Horne et al., 2010). Marshall et al. explain that patients' beliefs in symptoms should be acknowledged rather than deny, though these symptoms have not been associated with changes in blood pressure. Subsequently, addressing

patients' misconception about symptoms should be part of the consultation process.

Results obtained from the qualitative survey corroborates the high levels of misconceptions about symptoms of hypertension. Other key findings of the qualitative survey are attribution of hypertension to psychological causes, fears of adverse drug effects, and challenges with adjusting to appropriate lifestyle changes. According to the Self-Regulatory Model of illness (Browning et al., 2009), patients obtain information about illness from various sources, including friends, media, health professionals, and their past and current experiences with the ill-health (Petrie & Weinman, 2012; 2006). Both adherents and non-adherents obtained first information about their condition in the hospitals which is consistent with results of the quantitative survey that 95 percent of the patients were informed about the condition in the hospitals, and only 2 percent from personal experiences (Appendix C). Thus, affirming that hospitals are main sources for diagnosing hypertension (Tsiantou, Pantzou, Pavi, Koulierakis, Kyriopoulos, (2010).

In this study, hypertension was detected when patients visited the hospital to seek treatment for other illnesses. This suggests limited public health efforts aimed at screening the population for hypertension. The challenge is to identify people with hypertension in the larger population who are yet to be detected, as has been observed in other studies (Addo et al., 2012, 2006; Bosu, 2010). Though Churches and non-governmental organisations (NGOs) in Ghana are making efforts to screen church members for hypertension, the various district health offices in the

country would need to step up efforts at detecting high blood pressure cases in the larger population for early treatment.

From the in-depth interviews, both adherents and non-adhering patients attributed the causes of hypertension principally to psychological and lifestyle factors, which include worries about financial constraints, marital problems, alcoholism and sexual weakness. About one in two patients attributed hypertension to excessive worry and stress. Marshal et al. (2012), in a review of studies on hypertension, observed that a large number of participants in countries such as Ghana, United States of America (USA), Canada, the Netherlands, Thailand, and the United Kingdom thought hypertension is caused by stress. Other patients have attributed high blood pressure to psychological factors such as stress and fear (Kretchy, Owusu-Daaku & Danquah, 2014b). Chen et al. (2009) observe that patients with less causal attribution of hypertension to psychological factors are more likely to be adherent. The implication for this study is that participants are less likely to adhere to treatment, considering the high beliefs in psychological factors. Those with beliefs in lifestyle factors are relatively more likely to adhere to treatment because a change of habit with interventions such as alcohol control policies, intensive counselling, and health education could change lifestyle.

There is a general perception among both adherent and non-adherents groups that high blood pressure can be detected through appearance of symptoms. They insist those symptoms were not known to them until the condition was diagnosed. Symptoms identified from the

in-depth interviews are similar to those identified in the quantitative survey vis-à-vis cough, loss of libido, difficulty in sleeping, headache, fast heartbeat, restlessness, bodily weakness, and body heat.

Attribution of symptoms such as body pain, headache, fatigue, fast- heart-beat, stiffness of joints, dizziness, and difficulty with sleep, to hypertension has been reported (Lo et al., 2016; Granados-Gámez et al., 2015; Horne et al., 2010). According to Marshall et al. (2012), in countries such as the Netherlands, New Zealand, Spain, Thailand, United Kingdom, and United States, patients use the presence or absence of symptoms to determine whether their blood pressure is high. However, patients' perception of symptoms is inconsistent with the accepted medical model, which declares hypertension as symptomless. Their views about symptoms of hypertension affirm the Self-Regulatory Model's explanation that patients assign symptoms to hypertension just to make sense of the condition (Horne et al.,).

Granados-Gámez et al. (2015) found an association between symptoms and hypertension but was of the view that medication adherence could negatively be affected if patients believe in appearance of symptoms as indication of rising blood pressure (Chen at al., 2009; Horne et al., 2010; Ross et al, 2004). However, Marshall et al. (2012) observe that patients' beliefs in symptoms should be acknowledged.

Misconception about symptoms raises issues about the level of patient education on high blood pressure. According to the concept of the Self-Regulatory Model, patients with chronic illnesses are expected to be informed about the possible symptoms, causes, consequences, and

treatment (Leventhal et al., 1997). The evidence in this study suggests either the patients do not have adequate knowledge about hypertension, or they are ignoring information. Consequently, misconceptions about symptoms of hypertension might affect medication adherence and blood pressure control among the patients in Cape Coast. To address patients' misconceptions, clinicians need to first acknowledge the patients' views about symptoms in order to address them.

It was revealed from the study that both the adherents and the non-adherents apply unconventional remedies to stabilise suspected rise in blood pressure when they experience perceived symptoms. For example, repeating dosage or taking to sleep or rest instead of seeking medical care reflects inadequate knowledge about the management of hypertension. Tsiantou et al. (2010) also observed that though patients associate symptoms such as headaches and dizziness to hypertension, they sometimes do not seek hospital care until the symptoms are severe. The practice might contribute to low levels of medication adherence among patients in Cape Coast. The finding suggests the need to provide information on appropriate remedies when patients experience severe headache and dizziness.

Sudden surge in severe symptoms resulting in complications and hospital admissions was reported by mainly non-adherent patients. Known hypertensive patients on long term continued treatment are not expected to experience deep crisis which sometimes result in sudden collapse, and hospitalisation. As found in this study, these crises were triggered by alcohol misuse and perceived stress. Repetition of dose and

use of herbal preparations with the view of controlling stress might have compounded the crisis. The implication is that health personnel are not conforming to practices of stage two of the conceptual framework. The coping stage requires healthcare providers to provide counselling on coping skills to maintain adherence. Based on the findings made, there is need to intensify counselling on coping skills, and appropriate lifestyle practices particularly, avoiding repetition of doses and alcohol use among the non-adherents.

Combination of anti-hypertensive medication and herbal supplements was prevalent among non-adherents. Also reported in Appendix D of the quantitative survey, close to a quarter of the respondents used herbal remedies which were recommended by friends, with intention to cure hypertension. The use of herbal supplements is said to be prevalent among hypertensive patients worldwide. According to Odusola et al. (2014), patients in rural Nigeria supplement orthodox medicines with herbal preparations without informing their doctors. Marshall et al. (2012) reported that patients with hypertension in the United Kingdom, United States of America, Brazil and the Netherlands use herbs and other traditional remedies to manage hypertension (Marshall et al.). In exploring the use of complementary medicines for the management of hypertension in Ghana, Kretchy et al. (2014) reported that a larger number of patients who patronise herbal practitioners are hypertensive. The effects of unorthodox use of medication are complications and hospital admissions.

The results of the current study show clear differences between the adherent and the non-adherent participant regarding remedies. Some of the highly adherent patients indicated their preferences for the anti-hypertensive medicines. On the contrary, the non-adherents were fond of alternate care, specifically that of herbal use. It is evident their preferences for herbal treatment is informed by complaints about side effects of the anti-hypertensive.

The indulgence of participants in unorthodox practices such as herbal medication alongside medical treatment raises issues about treatment options. The use of herbal medicines with the view to cure hypertension, or revitalise sexual weaknesses perceived as resulting from the anti-hypertensive use may be deceptive. Clinicians ought to educate patients on available treatment options, including the appropriate complementary and herbal care as required by the coping stage of the conceptual framework. However, patients should be informed about the risks of alternate and unorthodox care practices.

Complaints about side effects of the anti-hypertensive medications were frequently made among the non-adherent patients. Cough, sexual weakness, stomach upset, and palpitation were reported. Side effects of anti-hypertensive use such as tiredness, increased frequency of urinary, and impotence among men have been reported widely in some countries, including the United States, Thailand, and the United Kingdom (Marshall, et al., 2012; Ogedegbe et al., 2004). Reports relating perceived side effects to poor adherence to medication have been

cited in Ghana, Nigeria, and Pakistan (Boima et al., 2015; Ogah & Rayner, 2014; AL-Ramahi, 2014).

Misconceptions about side effects of anti-hypertensive medicines were so strong among the non-adherents that some intentionally stopped their prescribed medication for herbal preparations. According to Tsiantou et al. (2010), patients in Greece also stopped treatment because they were afraid of side effects of the medicines. Complaints about side effects with long-term use of antihypertensive have been associated with poor adherence in studies from Ghana, Nigeria, and Pakistan as (Boima et al., 2015; Ogah & Rayner, 2014; AL-Ramahi, 2014). It could be suggested that perceived side effects of the antihypertensive contributed to the low prevalence of adherence in the sample.

Referring to the conceptual frame work of the study, the issue of side effects suggests inadequate patient information and counselling about the expected effects of the anti-hypertensive. The implication is that patients are less likely to remain adherent to treatment but are more prone to developing complications from use of unorthodox remedies. Patients' fears of side effects of antihypertensive should be addressed by enquiring from them their experiences of side effects, and intensifying counselling about potential effects of the medicines.

The level of forgetfulness with keeping to medication schedule was found in this study to affect close to 50 percent of the sample. Forgetfulness about medication is said to associate with hypertensive patients worldwide (Tsiantou et al. 2010; Jin et al., 2008; Harries et al., 2005; Ogedegbe et al., 2004;). In a study at the Komfo Anokye Teaching

Hospital in Kumasi, Harries et al. identified forgetfulness as the major reported barrier of adherence to hypertension therapy. In the United States of America, forgetfulness was cited as a barrier which was used as an excuse for patients who did not adhere to medication. Some explanations for forgetting medication according to Gbedegbe et al. include busy schedules, rush hours, and old age.

Patients develop various strategies to overcome forgetfulness about medication. For example, a study in Greece revealed that patients adjusted to their medication during breakfast, when they realised it was easy to remember their prescriptions in the morning (Tsiantou et al., 2010). Jin et al. (2008) showed how increased frequency of meals associate with medication. As a result, patients who had three meals a day took their medicines more regularly than those who had less than three meals a day (Jin et al.). It was revealed in this study that a male patient places his medicines on the dining table while a female patient places her medicines in her cosmetic container to be easily seen, and to serve as reminder to take.

Forgetting sometimes to take medication has been associated with low levels of medication adherence (Al-Ramahi 2014; Jin et al., 2008; Harries et al., 2005; WHO, 2003). To improve medication adherence in Cape Coast, the strategies adopted by some patients to keep medicines on dining tables and in cosmetic containers to serve as reminders are unique and should be promoted among patients. These two approaches could be part of the coping skills as postulated by the stage 2 of the Self-regulatory conceptual framework.

Awareness about lifestyle modifications was found to be average among both adherents and non-adherents as patients could mention practices such as increase fruit consumption, reduce alcohol use, and increase physical activity. Knowledge about lifestyle modifications has also been rated as average among some Ghanaian hypertensive patients in various reports (Marfo et al., 2014; Cappuccio et al., 2006). In the general population, there are reports of low adherence to recommended lifestyle modifications such as alcohol, smoking, fruits and vegetable intake in Ghana (Amo-Adjei et al., 2015; Doku et al., 2013; Tagoe & Dake, 2011).

Adaptation to the expected lifestyle changes is a challenge to patients as they encounter difficulties such as lack of interest, physical challenges and lack of support. These findings are consistent with Marfo et al. (2014) in a study with samples from Accra and Kumasi which suggests that patients who are aware of the modifiable lifestyle practices have difficulty avoiding salt, smoking, and alcohol consumptions (Marfo et al.; Cappuccio et al., 2006).

Adherence has been shown to correlate with lifestyle modifications, and that patients who do not take medication are less likely to exercise. Furthermore, practising fewer lifestyle changes for blood pressure control has been associated with low adherence to medication (Holt et al., 2013). Other reports indicate that negative lifestyles such as low physical inactivity, tobacco and alcohol misuse are likely to associate with risk of non-adherence to antihypertensive and

insulin injections (Menditto et al., 2015; Cené et al., 2013; Grodensk, et al., 2012; Bryson et al., 2008).

The average level of lifestyle awareness may not induce adherence in the Cape Coast Metropolis, in view of patient challenges with modifications. For example, it was revealed that some patients did not have control of food preparations and had no options but to accept whatever diet was offered. To overcome the challenges, relatives of patients should be invited to counselling sessions at the hospitals to be educated on the appropriate diet for hypertensive patients.

The results of the qualitative survey showed that perceived appearance of symptoms was seen as indications of high blood pressure, and that patients with high perceptions about the irregular occurrence of hypertension were less likely to be adherent to treatment. Forgetting sometimes to take medicines, worries about life events, and the perceived adverse effects of anti-hypertensive, were possible reasons for the low medication adherence in the sample. New strategies to overcome forgetfulness have been revealed, these are placement of medicines in cosmetic boxes and on dining tables to act as reminders. The next chapter provides an assessment of medication adherence levels, factors influencing adherence and non-adherence, and concludes with identification of significant factors that associate with medication adherence in the Cape Coast metropolis.

CHAPTER SIX

FACTORS INFLUENCING ADHERENCE TO HYPERTENSION MEDICATION

Introduction

Factors relating to the health care system, socio-economic and demographic factors, therapy related, as well as patient factors, combine to influence the extent to which patients adhere to prescribed medication and recommended therapies (Jin et al., 2008). Assessing the factors that affect medication adherence in a patient population is critical because it provides useful information for interventions. The objective of this chapter is to assess the factors that influence adherence as well as non-adherence to anti-hypertensive medication among the patients in the Cape Coast Metropolis.

Level of Medication Adherence

The main outcome variable defined as "adherence to medication" was originally categorised into three levels, namely low adherence (with a score < 6), moderate adherence (with a score 6 < 8), and high adherence (with a score = 8). However, for the purpose of this study the low and medium level scores were further collapsed into "low adherence or non-adherence" with a score of < 8, verses "high adherence or adherence" with score of 8 (Ross et al., 2004; Kretchy et al., 2014c). The rationale for the two level index was to ensure high and accurate response ratings and to strictly identify the adherent participant from the non-adherent participant. Furthermore, the index was dichotomised to facilitate

analysis. Measuring patient medication adherence reflects stage 3 of the conceptual framework of the present study.

Using the Morisky Medication Adherence Scale (MMAS-8) with the cut-off point of 8, the level of adherence to treatment among the participants was 22 percent (22.3 %). Table 10 presents the results of adherence scores by category.

Table 10: *Classification of Adherence*

Score	Frequency	Percent %
Low (score < 6)	110	31.4
Medium (score 6<8)	162	46.3
High (score = 8)	78	22.3
Type		
Non-adherent	272	77.7
Adherent	78	22.3
Total	350	100.00

Source: Field Data (2014)

Adherence by Background Characteristics

Evaluation of medication adherence is based on factors which are grouped as patient related, socio-economic, therapy related, health system related, and disease related. Patient factors such as age, sex, level of education, religious beliefs, and marital status may affect adherence to treatment. Other variables include ability to self-manage the illness and forgetfulness (Jin et al., 2008). Table 11 is a bivariate analysis indicating adherence by sex and patient background characteristics. The table presents data for both respondents who were found to be adherent to treatment and those who were non-adherent to treatment.

Table 11: *Medication Adherence by Background Characteristics*

Variable	Adherent						Non-adherent					
	Female		Male		Total		Female		Male		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total	**51**	**21.9**	**27**	**23.1**	**78**	**22.3**	**182**	**78.1**	**90**	**76.9**	**272**	**77.7**
Age												
40-49	5	13.9	1	3.4	6	9.2	31	86.1	28	96.6	59	90.8
50-59	16	17.8	10	27.0	26	20.5	74	82.2	27	73.0	101	79.5
60-69	14	26.4	5	20.8	19	24.7	39	73.6	19	79.2	58	75.3
70+	16	29.6	11	40.7	27	33.3	38	70.4	16	59.3	54	66.7
Marital Status												
Not married	3	30.0	0	0.0	3	10.3	7	70.0	19	100.0	26	89.7
Married	19	17.3	23	28.0	42	21.9	91	82.7	59	72.0	150	78.1
Divorced/Widowed	29	25.7	4	25.0	33	25.6	84	74.3	12	75.0	96	74.4
Education												
None	13	18.6	3	23.1	16	19.3	57	81.4	10	76.9	67	80.7
Primary	26	21.7	19	30.2	45	24.6	94	78.3	44	69.8	138	75.4
Secondary	10	38.5	0	0.0	10	26.3	16	61.5	12	100.0	28	73.7
Tertiary	2	11.8	5	17.2	7	15.2	15	88.2	24	82.8	39	84.8
Occupation												
Unemployed	28	26.2	8	22.2	36	25.2	79	73.8	28	77.8	107	74.8
Professional/Management	7	25.9	6	25.0	13	25.5	20	74.1	18	75.0	38	74.5
Service/Marketing	13	17.6	12	27.3	25	21.2	61	82.4	32	72.7	93	78.8
Agriculture/Fishing	3	12.0	1	7.7	4	10.5	22	88.0	12	92.3	34	89.5

Table 11, continued

Religion												
Christian, Orthodox	27	21.6	19	25.7	46	23.1	98	78.4	55	74.3	153	76.9
Christian, Charismatic	11	19.3	2	11.1	13	17.3	46	80.7	16	88.9	62	82.7
Islam	11	26.2	5	26.3	16	26.2	31	73.8	14	73.7	45	73.8
Other Religions	2	22.2	1	16.7	3	20.0	7	77.8	5	83.3	12	80.0
BMI												
<18.5	2	100	0	0.0	2	66.7	0	0.0	1	100.0	1	33.3
18.5-24.9	10	26.3	10	29.4	20	27.8	28	73.7	24	70.6	52	72.2
25.5-29.9	12	17.9	8	22.2	20	19.4	55	82.1	28	77.8	83	80.6
30+	27	21.4	9	19.6	36	20.9	99	78.6	37	80.7	136	79.1
BP control												
Controlled BP	11	21.6	11	34.4	22	26.5	40	78.4	21	65.6	61	73.5
Comorbidity (chronic)												
Presence of comorbidity	20	18.9	11	25.6	31	20.8	86	81.1	32	74.4	118	79.2
Years with hypertension												
< 1 year	5	23.8	5	45.5	10	**31.2**	16	76.2	6	54.5	22	68.8
1-9 years	38	22.2	16	19.3	54	**21.3**	133	77.8	67	80.7	200	78.7

10-19 years	7	21.9	5	25.0	12	**23.1**	25	78.1	15	75.0	40	76.9
20+ years	1	11.1	1	33.3	2	**16.7**	8	88.9	2	66.7	10	83.3
Family history of hypertension	32	21.9	16	26.2	48	**23.2**	114	78.1	45	73.8	159	76.8
# of Anti-hypertensive												
Single	20	24.1	15	23.4	35	23.8	63	75.9	49	76.6	112	76.2
Two	24	19.2	9	20.9	33	19.6	101	80.8	34	79.1	135	80.4
Three +	7	28.0	3	30.0	10	28.6	18	72.0	7	70.0	25	71.4
Frequency of dose												
Once daily	44	24.2	21	20.8	65	23.0	138	75.8	80	79.2	218	77.0
Twice daily	6	14.2	6	46.2	12	22.2	35	85.4	7	53.8	42	77.8
Thrice daily	0	0.0	0	0.0	0	0.0	6	100	2	100.0	8	100.0
Don't know	1	25.0	0	0.0	1	20.0	3	75.0	1	100.0	4	80.0
Received all medicines												
Yes	43	23.9	21	26.9	64	24.8	137	76.1	57	73.1	194	75.2
Understood treatment instructions												
Yes	44	25.1	23	26.1	67	25.5	131	74.9	65	73.9	196	74.5

Source: Field data (2014)

As shown in Table 11, the prevalence of adherence was higher among male participants (23.1%) than the female (21.9 %); among respondents aged between 70 and 90 years (33.3%) than those of 40-49 years (9.2%); and among the divorced or widowed (25.6%), than among the married couple (21.9%). Furthermore, medication adherence was higher in married male patients, than the divorced males (married male; 28%, divorced male; 25%), but higher among divorced females than married females (25.7%: 17.3%). Respondents with lower levels of education were better adherents compared to those with secondary and tertiary education (see Table 11). While 61 out of the 78 respondents with primary education or no formal education were adherent, only 17 out of the 78 with secondary and tertiary education were adherent.

Patients in professional or management positions were found to be at similar levels of adherence (25.5%) with the unemployed or retiree (25.2%) but attained higher levels of adherence than service providers (21.2%). The prevalence of adherence was higher among Muslims (26.2%) compared to the orthodox Christians (23.1%). While 13 charismatic Christians were adherent, only three (3) from the other religions were adherent (see Table 11). Patients of normal weight were more adherent (27.8%) than the overweight (19.4%) and the obese (20.9%). Twenty-seven percent (27%) of the respondents who had their blood pressure controlled at the time of the interview were adherent, though 74 percent of those with controlled blood pressure were found to be non-adherent to medication.

From the results (Table 11), 21 percent of the patients with additional chronic illnesses were adherent to medication. Also shown in appendix B, multiple chronic illnesses were found in 42 percent of the 350 patients, of which

diabetes and asthma were prominent. Regarding duration, 82 percent of all respondents had lived with high blood pressure in less than ten years, compared to 15 percent between 10 and 19 years, and 3 percent beyond 20 years (appendix C). However, adherence was found to be higher (23 percent) among respondents with 10 to 19 years duration of hypertension than those below ten years (Table 11). Additionally, 23 percent of the patients with family history of hypertension were adherent to treatment (Table 11).

Patients received between one (1) and four (4) different classes of anti-hypertensive medication (Appendix B). Nearly 50 percent of the 350 patients received two separate anti-hypertensive medicines, compared to 42 percent for those on one class of anti-hypertensive, and 10 percent on at least three (3) types of anti-hypertension medicines. However, the prevalence of adherence was found to be highest among respondents who received single prescription (28.6%) as shown in Table 11.

Furthermore, 81 percent of all respondents took their medicines once daily; 16 percent were placed on twice daily dosages, and 2 percent on thrice daily doses. There were 5 respondents (1%) who could not recollect the number of times they were told to take their prescriptions (see Appendix C). Medication adherence was more prevalent among respondents on once daily dosage (23 percent) than those on twice or more doses per day (see Table 11). Adherence levels were similar among respondents who took medicines once daily (23.0%) and those on twice daily prescriptions (22.2%).

On drug accessibility, 94 percent of the respondents obtained all prescriptions at the hospitals through the National Health Insurance Scheme (NHIS), which provides free basic medicines to subscribers (see Appendix E).

Among those who received all their prescribed medicines at the three hospitals, 25 percent were adherent (see Table 11). More male patients than the female who received all prescriptions at the hospitals were adherent (female 23.9%; male 26.9%).

The level of medication adherence among respondents who understood treatment instructions was low (25%) compared to those who understood medication instructions but were found to be non-adherent (75%). Further in Table 11, there were similar adherence levels among both male and female patients who understood medication instructions (female 25.1%; male 26.1%).

Effect of Lifestyle on Medication Adherence

Table 12 provides information about whether respondents who were found to have engaged in selected lifestyle practices were adherent to their medications or not. None of the four (4) current users of tobacco was adherent to medication. However, 22 percent (22%) of those who never used tobacco were adherent to treatment. As shown in Appendix B, 75 (21.4%) out of the 350 respondents were current users of alcohol, 134 had stopped using alcohol, but 141 had never used alcohol. Sixty-four (64) of the 75 current users took alcohol in the last 7 days before the interview. However, 26 percent of respondents who never used alcohol were adherent, compared to 22 percent of those who had stopped alcohol, and 15 percent for current users (see Table 12). Medication non-adherence was higher among current users of alcohol (85 percent) than those who never used alcohol (74 percent). Beer and "Akpeteshie" (local gin) were the two alcoholic beverages which were found to be frequently used by respondents.

Table 12: *Lifestyle Relationship with Medication Adherence*

Variable	Adherent						Non-adherent					
	Female		Male		Total		Female		Male		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Total	**51**	**21.9**	**27**	**23.1**	**78**	**22.3**	**182**	**78.1**	**90**	**76.9**	**272**	**77.7**
Tobacco use												
Current user	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0	4	100.
Former user	1	12.5	9	25.7	10	23.3	7	87.5	20	74.3	33	76.7
Never used	50	22.2	18	23.1	68	22.4	175	77.8	60	76.9	235	77.6
Alcohol use												
Current user	5	19.2	6	12.2	11	14.7	21	80.8	43	87.8	64	85.3
Former user	23	23.0	7	20.6	30	22.4	77	77.0	27	79.4	104	77.6
Never used	23	21.5	14	41.2	37	26.2	84	78.5	20	58.8	104	73.8
Physical activity												
None	33	20.6	14	20.0	47	20.4	127	79.4	56	80.0	183	79.6
1-3 days	8	23.5	6	30.0	14	25.9	26	76.5	14	70.0	40	74.1

4-7 days	10	25.6	7	25.9	17	25.8	29	74.4	20	74.1	49	74.2
Take fruits in last 7 days	40	20.5	23	26.7	63	22.4	155	79.5	63	73.3	218	76.9
Take vegetables in last 7 days	40	23.1	20	23.0	60	23.1	133	76.9	67	77.0	200	76.9
Ability to name one diet control measure	35	22.4	19	22.9	54	22.6	121	77.6	64	77.1	185	77.4
Ability to mention one effect of uncontrolled diet	28	25.7	10	14.9	38	21.6	81	74.3	57	85.1	138	78.4
Told how to manage BP at home	8	12.1	8	19.0	16	14.8	58	87.9	34	81.0	92	85.2
Regularly check BP at Home	6	12.2	3	13.0	9	12.5	43	87.8	20	87.0	63	87.5
Received support	16	17.0	7	21.9	23	18.3	78	83.0	25	78.1	103	81.7

Source: Field data (2014)

Adherence levels were similar among respondents who engaged in 1-3 days of physical exercise (25.9%), and those with 4-7 days (25.8%) in the last 7 days before the interview. Of those who never planned to do physical exercises, 20 percent (20%) were adherent. Furthermore, medication non-adherence was high among those who did not engage in any physical exercises in the past seven days (80 percent).

Twenty-two percent (22%) and 23 percent (23%) of the patients who took fruits and vegetables respectively, within the last seven days before the interview, were found to be adherent to treatment (see Table 12). Twenty-two percent (22%) of those who could name one diet control measure were found to be adherent. Among the patients who had been taught to manage hypertension at home, 15 percent were found to be adherent, compared to 85 percent among those who were given home management skills but were not adherent to treatment (85 percent).

Further in Table 12, thirteen percent (13%) of respondents who claimed to have regularly checked their blood pressure at home were adherent, compared to those who monitored blood pressure at home but were not adherent to treatment (87%). Of those who received support for managing blood pressure, 18 percent adhered to treatment, compared to 82 percent among those who received home support but were not adherent to medication.

Factors Contributing to Medication Non-adherence

Appendices 2 to 5 provide additional information about the health behaviour of the patients, which include views about the diagnosis, duration, meaning of hypertension, and selected lifestyle practices. Ninety-five percent (95%) of the patients became aware of their condition first at the hospital, two

percent (2%) through personal experiences, two percent (2%) were informed by friends, and one percent (1%) by herbalists. Over 66 percent (66.3%) of the patients did not know the values of normal blood pressure, with twenty percent (20%) mentioning incorrect values. However, 14 percent (13.7%) of the patients were able to mention the correct values of normal blood pressure (Appendix C).

Fifty-six percent (55.7%) of the 350 patients could not describe hypertension appropriately (Appendix C). The meaning of hypertension varied among respondents, with some describing the condition as "excess volume of blood in the body" or "mogya mbordo" (15.1%), a disease attributed to obstruction of blood vessels (11.7%), and palpitation of the heart (17.4%). Others referred to hypertension as "akoma yare" or "heart disease", as an inherited condition, and a condition associated with excess "worry" or "adwen-dwen mbordo". A number of patients also related hypertension to sudden death (2), stroke (2), and a disease that is usually induced by witchcraft (6). Furthermore, 58 percent of the patients could not mention any of the causes of hypertension. The main causes of high blood pressure as identified by the patients were worry (14%), uncontrolled diet (9.7%), stress (10%), alcohol intake (3.1%), anger (2.6%), and hereditary (2.6%).

The mean number of physical activity days among respondents (computed as total physical activity days divided by total number of respondents) was found to be 1.5 days (see Appendix B). Sixty-six percent (66%) of the patients had no planned physical activity sessions, compared to 34 percent of those with planned physical exercises. Of those with scheduled activities, 55 percent engaged in 4-7 days of exercise, compared to 45 percent of those with 1-3 days (see Appendix B). Among those who had no exercise

sessions, the main reasons for not doing so were lack of recreational facilities, busy work schedules, tiredness, poor health, laziness, and not told by health workers to exercise. Patients whose work involved physical activity felt that the nature of their work provides them with adequate body exercise.

The mean days of fruits intake among respondents (calculated as total number of days, fruits or vegetables consumed divide by total number of respondents as by WHO STEP) were 3.4 days, and that for vegetable intake were 3 (2.98 days). Eighty percent (80.3%) of the patients claimed to have taken fruits in the last seven days before the interview, of which 22 percent were adherent to treatment (see Appendix B & Table 12). Regularly consumed fruits were, orange, banana, pawpaw, water melon and pineapple. The main reasons for not regularly taking fruit were, lack of appetite for fruits, unaffordable prices of fruits, and the perceptions that fruits cause diabetes, and stomach upsets.

Sixty-eight percent (68.3%) of the patients had received counselling to control diet and could mention one diet control measure (see Appendix B). Of those who were counselled on diet, 77 percent were adherent to treatment. Half (50.3%) of the respondents mentioned at least one perceived effect of uncontrolled diet. Twenty-two percent (22%) of those who could mentioned the effect of uncontrolled diet were adherent to treatment (see Appendix B & Table 12). The main perceived effects of uncontrolled diet according to the patients were, "uncontrolled diet leads to premature death," "cause of diabetes and stroke", "increases body weight, and raised blood pressure" (see Appendix B).

Vegetables which were frequently used among the patients include, green cocoyam leaves (kontomire), cabbage, carrot, and garden eggs. Patients who regularly used vegetables such as cocoyam leaves and garden eggs in soups

and sauces felt they had no need for additional serving of vegetables. The main reasons for not adhering to dietary changes include, little control over preparation of food, cost, lateness and difficulty avoiding salt. A 44 year male non-adherent observed in the following statement that:

> Eating in restaurants makes it difficult for me to observe diet recommendations (non-adherent; male, 44 years).

There were patients such as the poor and some retirees who did not determine what they eat. A 63 year old explains in the following narration:

> I have no control of how my food is prepared. I take what is provided to me (non-adherent; male, 63 years).

A second reason is unaffordable cost. Some patients lacked funds to afford the recommended foodstuff, as said by a fifty-one year old male patient:

> I am facing financial challenges and can't avoid some foodstuff (non-adherent; male, 51 years.

There were patients who had difficulty avoiding salt as observed by a 62 year old male:

> I cannot eat food without salt (non-adherent; male, 62 years).

Late arrival from work and eating late might be a regular occurrence among workers as indicated by a male patient:

> I close from work late at night (non-adherent; male, 46 years).

Forgetfulness was mentioned as a barrier of non-adherence among patients:

> Sometimes, I forget about the advice (non-adherent; female, 50 years).

Less than a quarter (21%) of the patients claimed to have regularly checked their blood pressure at home, but 79 percent had their BP checked only

during their visits to the hospitals (see Appendix D). Among those who regularly checked their blood pressure at home, 12 percent were adherent, compared to 88 percent of those who checked but were not adherent to treatment (see Table 12). While 41 patients owned blood pressure monitoring equipment, 8 persons paid to have their blood pressure checked. Furthermore, nine (9) patients had their BP checked at the neighbouring clinic, four (4) in nearby pharmacy shops, and 3 by a nurse in the neighbourhood. Five (5) of the 41 who owned blood pressure monitors were adherent, but 36 were non-adherent to treatment. Only one (1) patient who was checked by a nurse was adherent (Appendix D).

Regarding responsibility for blood pressure control, 251 patients were of the view that the doctor is responsible (Appendix D). Among those who had trust in the doctor, 75 percent were not adherent to treatment (Appendix D). Of those who held beliefs in their personal control efforts (104), 83 percent were non-adherents. While 10 respondents see the nurse to be responsible, eight (8) held beliefs in family members. Two (2) of the patients believed in the power of God and Allah respectively, however, 11 patients could not tell who was responsible for ensuring stability of blood pressure.

Figure 4 presents information on selected factors of non-adherence behaviour. The scores refer to patients who were non-adherent to treatment. More than two-thirds of the respondents were affected by forgetfulness, either they forgot sometime to take their anti-hypertensive medicines (49.1%) or they forgot to take them along when travelling (31.7 %).

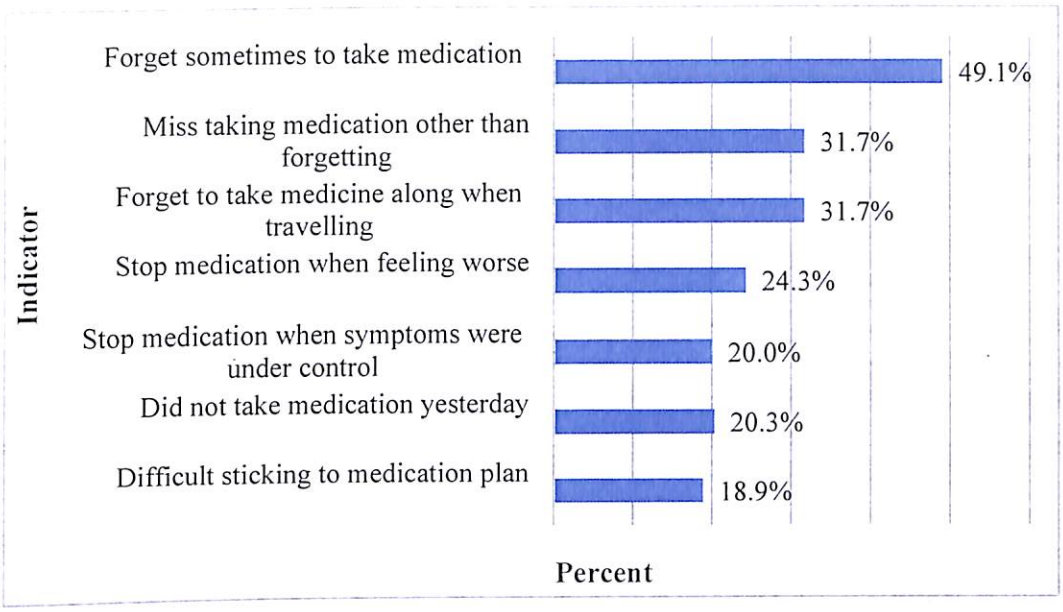

Figure 4: Pattern of non-adherence behaviours
Source: Field data (2014)

The other reasons for non-adherence were those who missed medication for reasons other than forgetting (31.7%), those who stopped medication when feeling worse (24.3%), and those who felt perceived symptoms were controlled (20.0%) as shown in Figure 4.

There were distortions about medication instructions. Some patients stopped medication because their stocks got finished before the next visit to the hospital. Others complained of sexual weaknesses, palpitation or fast heartbeat, however, others were fed-up with the medicines. Actions of some patients after missing their medication include, continue with medication as and when drugs were available (23), take the drug on the following day (27), and take the drug upon return from journey (11). While other patients refused to take medicines when travelling, some only took the medicines when they perceived the appearance of symptoms (see Appendix E).

When patients express concerns about perceived adverse effects of the medicines, they are less likely to adhere to treatment (Horne et al, 2010). From

the results as shown in appendix E, 33 percent of the patients had seen improved health and found the medicines beneficial, though there were concerns of fast heartbeat (9.4%), sexual weaknesses (4), frequent urination (3), cough, headache, as well as fears of addiction (5) to medicines (see Appendix E).

Less than a quarter (20%) of the 350 respondents used alternate medicines such as, food supplements and herbal preparations (16 percent). Among the herbs used were Moringa leaves, Tetrapleura tetraptera ("prekese") fruit. Identified herbal preparations were "Adutwumwaa Bitters", and "Duapa Herbal Mixture" which are names of herbal products in Ghana. Some of the patients used herbs concurrently with the anti-hypertensive medication (see Appendix D). Thirty-seven (37) out of 56 users were found to have combined herbal and orthodox medicines. While 13 respondents stopped the anti-hypertensive when they decide to use herbs, 5 respondents only use herbs when their stock of anti-hypertensive got depleted (see Appendix D).

Patients gave varied reasons for using herbs: 24 used herbal medicines to cure hypertension, five (5) were upon advice by friends, and five (5) ostensibly to support the anti-hypertensive medication (see Appendix D). While two (2) patients felt better with herbs, one (1) used herbs with the intension to prevent impotency. Thirteen (13) out of the 56 herbal users claimed they did not experience improved health, but six (6) claimed to have experienced improvement after the herbal use (Appendix D). Regarding treatment options among herbal users, 48 of the 56 respondents later preferred allopathic treatment, 17 preferred to combine herbal medication with the antihypertensive, but five (5) preferred herbal preparations to antihypertensive medicines (see Appendix D).

Figure 5 assesses the prescribers' consultation process from patients' perspectives. It shows the level of patients' knowledge about the causes, treatment, and expected outcomes, using key indicators of consultation. The graph provides information that classifies the consultation process into either compliance-based or adherence-based consultation.

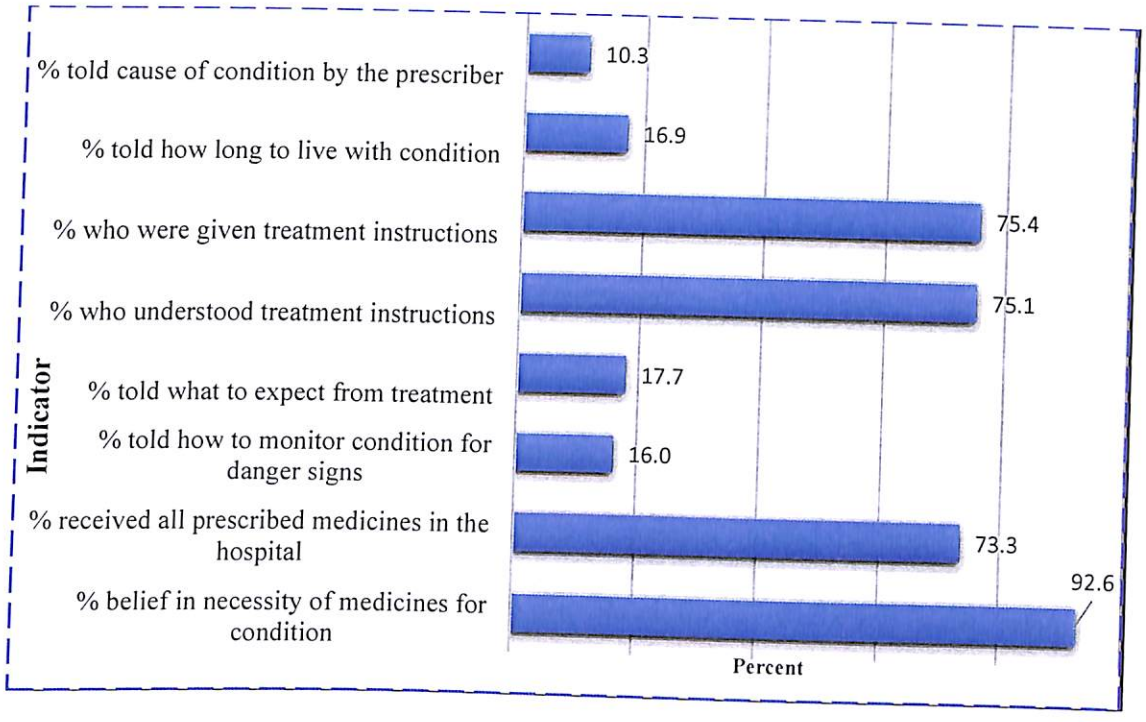

Figure 5: Patients' assessment of the consultation process
Source; Field data (2014)

As shown in Figure 5, ten percent(10.3%) of the 350 patients were told the cause of their condition, 17 percent (16.9%) were told the timeline of hypertension, 18 percent (17.7%) were told what to expect out of the treatment, and 16 percent (16%) were told how to monitor their condition for danger signs. Three out of 4 patients received treatment instructions (75. 4%), and about same understood the instructions (75.1%), 73 percent received all prescribed medicines in the hospital, with 92 percent expressing faith in the efficacy of the medicines (Figure 5).

From the scores as shown in figure 5, the results depict the compliance-based consultation method with emphasis on medication as shown by the long bars. With the compliance-based process, patients are made to understand dosages, with information on the benefits of treatment. In addition to medication, the adherence-based consultation process provides holistic patient information on causes, timelines, and treatment outcomes, with counselling on home management. However, these were less emphasized as shown by the short bars (Figure 5).

Significant Factors of Medication Adherence

The Chi-square statistic was used to assess associations between patient background characteristics, health related factors, self-management factors and medication adherence, using medication adherence as the outcome variable. Selection of the independent variables for the analysis was based on the issues discussed in literature. Medication adherence was coded "1" for adherence and "0" for non-adherence. Table 13 presents the results of the Chi-square statistic at $p < 0.05$, for relationships between medication adherences and the selected variables.

The second hypothesis of this study was to test whether adhering to medication is significantly related to patient age and level of education. Based on the sample, the results (Table 13) report a statistical significant association between patient age and medication adherence ($\chi 2 = 12.600$, $p<0.006$). The strength of the association is weak but positive (Cramer's =0.19) as shown in Table 14. However, there was no significant relationship between patients' levels of education and medication adherence as postulated.

The results in Table 13 further show a significant relationship between patients who understand treatment instructions and medication adherence at $\chi 2$ (1) = 6.215, P < 0.013). Therefore, patients who understand the treatment instructions are likely to adhere to medication. Similarly, there is a statistical significant relationship between patients who monitor blood pressure at home $\chi 2$ (1) = 5.012, P-0.025 and medication adherence, implying that those who monitor blood at home are likely to adhere to medication.

Table 13 further shows that gender, marital status, occupation, patients who receive all their prescribed medicines at the hospital, and those who receive family support did not significantly associate with medication adherence (Table 13).

Table 13: *Analysis of factors affecting Medication Adherence*

Variable	$\chi 2$	df.	p-value
Background			
Age	12.600	3	0.006
Marital Status	3.215	2	0.200
Level of Education	2.678	3	0.444
Occupation	4.108	3	0.250
Received all prescription at hospital	3.600	1	0.058
Understand Treatment Instructions	6.215	1	0.013
Monitoring blood pressure @ home	5.012	1	0.025
Receive Home Support	1.8	1	0.174

*P < 0.05

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.49.
b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.88.
c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.54.

Source: Field data (2014)

Table 14 provides further breakdown of the significant relationship between patient age and the levels of medication adherence adjusted by gender. The result indicate a statistical significant relationship between male patients and medication adherence ($\chi 2$ (3) =11.433, p-0.010). Therefore, gender explains the statistical significant relationship between patient age and medication adherence, and that the male patients were more likely to be adherent compared to the female. The strength of the relationship is moderate and positive (Cramer's = 0.313).

Inspection of the standardised residual values in Table 14 explains that patients at age 40-49 years (Std. residual of -2.2) were less likely to be adherent to their medicines, as per the sample. The result specifically points out that male patients at age 40-49 years (Std. residual = -2.2) were less likely to be adherent. It further indicates that male patients aged 70 years and above (std. residual = 2.1) attained significance more than expected, therefore, male patients at least 70 years have the highest odds of medication adherence compared to male patients at 40-49 years.

Table 14: Assessment of Strength, Direction, and Effects of Age on Medication Adherence adjusted for Gender

Test type	Overall Statistic	Female	Male
X^2	12.00	4.765	11.433
df	3	3	3
p-value	0.006	0.190	0.010
Phi	0.190	0.143	0.313
Cramer's	0.190	0.143	0.313
Standardised Residual values			
40-49 years	-2.2		-2.2
50-59 years			
60-69 years			
70 + years			2.1

Source: Field data (2014)

Discussion

The chapter assessed patients' levels of adherence to medication, and the factors which influence treatment adherence and non-adherence. The results from the sample indicate low prevalence of medication adherence among the patients. The factors which associated with medication adherence in this study were increasing age, understanding treatment instructions, and monitoring blood pressure at home. However, there was no association between educational status and medication adherence as posited by the study. Forgetting to take medicines, use of herbal preparations, fear of adverse effect of medicines and emphasis on the compliance-based consultation process were the main factors of non-adherence among the sample of patients in the Cape Coast Metropolis.

Based on the sample, the prevalence of anti-hypertensive medication adherence was estimated to be 22 percent in the Cape Coast Metropolis. The rate is slightly higher among males than female patients, and among those of 70 years and above. The level of anti-hypertensive medication adherence in this study falls within the reported range of 7 and 47 in the country (Boima et al., 2015; Kretchy, Owusu-Daaku, & Danquah, 2013; Laryea, 2013; Buabeng et al., 2004). Reports from other countries show similar results. For example, adherence rates of 53 percent has been recorded in Malaysia, 33 percent in Congo, 53 percent in China, and 21 percent in Nigeria (Lee et al., 2013; Nsitou et al., 2013; Li et al., 2012; Ramli et al, 2012; Ikechuwku et al., 2010).

The trend points to low levels of medication adherence among hypertensive patients in Ghana. Comparatively, patients who take more than 80 percent of the daily prescriptions are considered adherent, according to Haynes et al. (2008). One would therefore expect a higher proportion than less than a quarter (22%) of the patients in the study to maintain adherence after years of continuous treatment.

The results further show high levels of medication adherence with increasing age, but high medication non-adherence among the lower ages (see Table 11). Age was found to be statistically significant with medication adherence ($\chi 2 = 12.600$, $p<0.05$). While increasing age at 70 years associated with increasing levels of adherence, patients between 40 and 49 years were less likely to be adherent to treatment. Furthermore, gender contributed significantly to the relationship between patient age and medication adherence, and that the male patients were more likely to be adherent than the female (Table 14).

The null hypothesis is therefore rejected, and that there is significant association between age of a patient and adherence to medication in the Cape Coast Metropolis according to the sample. This finding is consistent with studies that have established positive relationships between medication adherence and older age groups (Lo et al., 2016; Boima et al., 2015; Lee et al., 2013). However, there are studies in Ghana that have not found significant relationships between age and medication adherence (Kretchy 2014c; Laryea, 2013).

The reasons for the positive association of medication adherence with older aged patients are not explained in the study. However, Boima et al. (2015) observed that younger patients might be less concerned about their health needs. According to Lee et al. (2013), the elderly are associated with multiple diseases and therefore are used to medication. Contrary, a study among tuberculosis patients in Turkey found that younger ages below 40 years were more compliant than patients aged above 50 years (Balbay et al., 2005). The finding from this study suggests the need to tailor health promotion and education interventions to address non-adherence among hypertensive patients at ages below 60 years, particularly, patients between 40 and 49 years.

There was no significant association between levels of education and medication adherence among patients (Table 13). However, the prevalence of medication adherence was higher among patients who had primary or no formal education than those with secondary and tertiary education (see Table 11). The proposition regarding increasing levels of education and positive health outcomes therefore, continues to ignite debate (Altindag et al., 2011; Grossman, 2008). There are reports of lower medication adherence in patients with higher

educational statuses (Boima et al., 2015; Harries et al., 2005); others associate increasing levels of education with higher medication adherence (Menditto et al., 2015; Bello et al., 2010; Ikechuwku et al., 2010). Boima et al. (2015) conducted a study among 357 hypertensive patients selected from Ghana and Nigeria to assess the factors associated with medication non-adherence. It was found that 71 percent of the respondents with formal education were not adherent, compared to 48 percent of those with no formal education. It suggests better adherence among respondents with no formal education. A related study by Ikechuwku et al. found direct relationship between educational level and medication adherence among 756 respondents in Nsuka, Nigeria. According to the result, every increase in educational level increases adherence by 12 percent (12.1%), suggesting that higher educational levels improve adherence to medication.

Though there was no explanation to the finding in this study, Harries et al. (2005) attributes the negative association of formal education with low medication adherence in Ghana to possible exposure to false beliefs about hypertensive medication. The high prevalence of medication adherence among patients with lower levels of education as found in this study suggests the need to improve counselling among patients with high educational levels.

Patients who claim to have understood their treatment instructions were significantly more likely to adhere to treatment (see Table 13). Understanding treatment instructions is a key determinant of medication adherence, because patients with poor knowledge about the treatment may avoid medication when they do not experience perceived symptoms (Odusola et al., 2014; Alsolami et al, 2012). In spite, of the positive relation in this study, there were evidences of

misrepresentation of treatment instructions. For example, some respondents took medicines at odd hours, and others days after missing earlier dosages. While some patients had their medicines totally depleted days before visiting the hospital for replenishment, some respondents avoided medication when embarking on a journey for fear of frequent urination. There were those who stopped medication when they felt well, and when they perceived adverse effects of medicines such as fast heart-beat (see Figure 4 & Appendix E). These issues suggest the need to provide information on early replenishment and continuous medication even when symptoms subside. Patients are to be informed to report adverse drug reactions to the doctor or nurse for assessment.

In exploring the relationship between home blood pressure monitoring and medication adherence, it was found that patients who regularly checked their blood pressure levels at home were more likely to adhere to treatment than those who did not (X^2 (1) =5.012, P- <0.05). The result is consistent with findings in a review of 11 control trials where six of the studies showed significance relationships between home blood pressure monitoring and medication adherence (Ogedegbe et al., 2006). Patients are expected to regularly monitor their blood pressure levels in order to avoid crisis. Unlike the usual monthly clinical assessments at the hospital, regular monitoring of blood pressure at home provides information on impending crisis (Parati et al., 2010). In spite of the association, 79 percent of the patients had their blood pressure checked only at their next schedule visits to the hospital (see Appendix D). The effect is that patients may end up with complications while at home, where they do not have contacts with the prescriber until a month or two.

In view of the positive effects of home blood pressure monitoring on medication adherence (Mcmanus et al., 2009; Ogedegbe & Schoentnater, 2006), there is a need to empower patients with self-management skills, which include training on use of BP monitors. However, it was found that only 41 of the 350 respondents owned blood pressure equipment (see Appendix D). Furthermore, there was low patronage at nearby facilities for regular blood pressure checks. For example, eight patients paid for BP checks, nine patients regularly checked at clinics, and four in near-by pharmacy shops. The finding underscores the need to instil self-management skills to improve adherence among patients.

The main reasons for the low levels of adherence and the corresponding high non-adherence rates among the patients were, forgetfulness, regular use of herbal medicines, combination of anti-hypertensive with herbal preparations, and perceived adverse effects of medicines. These findings are consistent with studies in Ghana and Nigeria (Kretchy et al., 2014c; Botchway, 2014; Laryea, 2013; Osamor et. al., 2011; Buabeng et al., 2004).

There was a relatively high level of forgetfulness among patients (49 percent). Some patients were non-adherent because they had challenges remembering to take medication. Forgetting to take medication has been identified as a barrier which has significant association with low levels of adherence (Al-Ramahi 2014; Jin et al., 2008; Harries et al., 2005). The study by Harries et al. at the Komfo Anokye Teaching Hospital in Kumasi identified forgetfulness as the major reported barrier to adherence with hypertension therapy. To overcome forgetfulness in medication adherence, patient reminder systems are used. For instance, a study in Japan used meal frequency as a reminder to take medication. As a result, patients who had three meals a day

took their medication more regularly than those who had less than three meals a day (Jin et al.). Therefore, overcoming forgetfulness is key to maintaining improved adherence levels in the Metropolis. As has been revealed in this study keeping medicines at sightedness is a strategy to improve adherence.

There were misconceptions about the use of complementary medicines, particularly herbal medicines among non-adherents. Use of herbal preparations to control blood pressure, avoid impotency and other perceived side effects of anti-hypertensive medication was reported among the patients. While this study recorded herbal use among 16 percent of the patients (Appendix D), a study by Osamor et al. (2011) reported 63 percent in Nigeria, and 20 percent by Kretchy et al., (2014) in Ghana. Patients' beliefs in the efficacy of complementary medicines is corroborated by the work of Osamor et al. in which patients claim hypertension is curable with traditional medicine. Kretchy et al. on the other hand, attributed patients' preference for complementary medicines to failure to accept that hypertension is a chronic condition. Therefore, the belief that herbal preparations could cure hypertension may have negative impact on some patients.

These findings suggest a need to control the marketing of complementary and herbal medicines which are said to be capable of curing hypertension. The establishment of the Traditional Medicine Practice Act, Act 575 to regulate, register and license the practice of complementary and herbal medicines in Ghana, has encouraged the proliferation of herbal preparations. Furthermore, herbal preparations are widely accepted by some patients in Ghana as alternatives for the perceived adverse effects of antihypertensive. In view of patients' preference for traditional medicines, the Ghana Health Service

has recommended sale of approved herbal preparations at the hospitals to patients who opt for them (Botcwey, 2014; Abel & Busia, 2011). However, the Ghana Health Service may need an impact assessment of the policy since there is growing misconception about the use of herbal preparations for treatment of hypertension.

Concerns were raised among patients about anti-hypertensive side effect including fast heartbeat, sexual weaknesses, frequent urination, cough, and headache (see Appendix D). Similar concerns about side effects of anti-hypertensive medication have been reported among patients in a combined study involving Ghanaians and Nigerians (Boima et al., 2015). The findings further showed that patients were concerned about addiction due to over-dependence on medicines. The policy on quality assurance aimed at improving medication instructions in the Ghana Health Service facilities should be intensified to address perceived adverse effects of drugs (Bannerman, Twenoboa, Offei, & Acquah, 2002). Counselling should also be intensified to allay patients' fears of addiction to medicines.

The chapter discussed issues affecting anti-hypertensive medication adherence as well as the causes of non-adherence among a sample of patients receiving treatment for hypertension in the Cape Coast Metropolis. There is a need to find interventions to address the issues that affect medication adherence, such as, patient difficulty with remembering to take medication and adverse side effects of medicines. Interventions should be tailored to suit patients below age 60 years. The next and final chapter provides a summary of the main findings of the study, conclusion, and recommendations for practice.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Hypertension is noted for the high morbidity and mortality burdens worldwide, contributing to 7 percent of the global disease burden (WHO, 2014a, 2013). Effective anti-hypertensive medicines are available however, the levels of medication adherence globally remain low (WHO, 2013). This makes it necessary for continuous research to explore the factors affecting patients' adherence behaviour in Ghana. Quantitative and qualitative research techniques were used to assess the factors that may influence adherence to therapy in the Cape Coast Metropolis. The Self-Regulatory Framework formed the basis for understanding patients' perceptions and beliefs about hypertension. The level of medication adherence was measured using the Morisky Medication Adherence Scale (MMAS-8), and patient's perceptions were assessed with the Illness Perception Questionnaire for hypertension (IPQ-R). This concluding chapter provides a summary of the main findings, conclusion, contributions to knowledge, and suggestions for future research, and practice.

Summary of Main Findings

The objectives of this study were to explore patients' perceptions and experiences of hypertension and assess the factors that influence adherence to medication. The effects of age, educational status, and perceptions of medication adherence were tested for significance. Based on the sample, it was observed that there were relationships between perceived cyclical nature of hypertension, age, understanding treatment instructions, as well as Home blood pressure monitoring and Medication adherence. Adherence among the patients

was 22 percent. There was emphasis on compliance-based patient-doctor consultation as opposed to the adherence-based procedure. The main causes of non-adherence among the patients were misconceptions of hypertension, fears of adverse effects of medicines, and forgetfulness.

There was a significant relationship between perceived periodic occurrence of hypertension and adherence ($\chi 2$ (2) = 18.378, $p < 0.001$). The results further showed that patients with low perceptions of the irregular nature of hypertension were more adherent to medication than those with high perceptions. Furthermore, female patients with low perceptions of the perceived cyclical concept were more adherent than male patients. As observed by Ross et al. (2004), patients with the perception that hypertension occurs at certain periods and stabilises at other times, may avoid medication when they perceive disappearance of symptoms. Patients with low perceptions that hypertension occurs periodically suggests they are more likely to take their medication irrespective of appearance of symptoms. However, seventy percent of the patients in this study held moderate to high perceptions that hypertension occurs and goes in cycles (see Table 4). Based on the Self-regulatory Conceptual Framework which guided the study, it was observed that patients lacked adequate knowledge about the nature of hypertension. This might have contributed to the low levels of medication adherence in the sample.

The in-depth interviews also exposed the perceptions of patients that hypertension could be recognised by appearance of specific symptoms including, dizziness, difficulty sleeping, fast heartbeat, restlessness, and body weakness. The result affirms the Self-regulatory Theory's position that patients assign symptoms to hypertension just to make sense of the condition (Horne et

al., 2010; Petrie & Weinman. 2006; Leventhal et al., 1998). Both adherent and non-adherent patients claimed to have experiences with symptoms. Their perceptions are inconsistent with the medical view that hypertension is symptomless (Lo et al., 2016; Granados-Gámez et al., 2015; Marshall et al. 2012; Horne et al., 2010). As explained by Granados-Gámez et al. medication adherence could be negatively affected if patients associate symptoms with hypertension. It is evident in this study that patients' misconceptions about symptoms of hypertension might have contributed to the low levels of adherence to medication in the sample. This suggests that patients were not well informed about the symptomless nature of hypertension.

Patient age was found to be a significant determinant of medication adherence ($\chi 2 = 12.600$, $p<0.006$). Patients aged 70 years and above were more likely to be adherent than patients aged 40-49 years. The result is consistent with suggestions which associate medication adherence with older age groups (Lo et al., 2016; Boima et al., 2015; Laryea. 2013; Lee et al., 2013). A possible explanation is that younger patients show less concern for their health needs than older patients (Boima et al.) The findings reinforce the belief which suggests that the aged were better motivated than the younger ones to adhere to medication, because they show concern for their health needs.

Patients who claimed to have understood their treatment instructions were significantly more likely to adhere to treatment than those who did not ($\chi 2$ (1) = 6.215, $P < 0.013$). This is expected since there is evidence that patients with sufficient knowledge about the management of hypertension are likely to adhere to medication (Jankowska-Polańska et al., 2016; Sweileh et al., 2014; Ahmad et al., 2013; Ambaw et al., 2012; Ramli et al., 2012). The underlying

principle is that understanding treatment instructions affects patients' medication behaviour. For example, patients with poor knowledge about treatment may be tempted to stop medication when they no longer experience perceived symptoms (Odusola et al., 2014; Alsolami et al., 2012).

In spite of the positive relationship shown between clarity of instructions and medication adherence, there were instances of misinterpretation of prescriptions. For example, some of the patients avoided medicines when embarking on journeys to avoid the discomfort of passing frequent urine. While others stopped medication because they felt they were well, some patients were concerned about the perceived adverse effects of the anti-hypertensive medicines (Figure 4). These findings emphasise the need to ensure that all patients understand their medication instructions as advocated by the self-regulatory framework of this study.

In this study patients who regularly checked their blood pressure at home were more likely to adhere to medication than those who did not ($\chi 2$ (1) =5.012, P- 0.025). As found in other studies, patients who monitored their blood pressure regularly, would be motivated to adhere to treatment (Macmanus et al., 2009;

One key finding of this study is the emphasis on compliance-based consultation as opposed to adherence or concordance (Horne et al., 2005). As per the assessment of patient-doctor communication or interactions (see Figure 5), the results point to compliance which lays emphasis on medication, treatment instructions, making medicines available to patients, and making patients believe in the necessity of medicines. In addition to medication, the adherence-based consultation process places emphasis on patient education,

self-management and empowerment. The doctor explains the causes and duration of hypertension, expected treatment outcomes, and the need to regularly monitor blood pressure levels. The implication of the finding is that patients may not receive the requisite information about hypertension during consultation. This suggests a reorientation of the consultation process towards patient education, self-management and empowerment skills.

Close to a quarter of the patients used alternate medicines including herbal remedies with the intention to cure hypertension (Appendix D). In-depth interviews with the patients further revealed that herbal use was prevalent among non-adherent patients compared to the adherents. Furthermore, patients' preference for herbal treatment was informed by their concerns about side effects of the anti-hypertensive and the fear of getting addicted to medication.

Evidences obtained from patient treatment experiences suggest that their concerns about side effects of the anti-hypertensive medication might have contributed to the low prevalence of adherence in the Metropolis. Additionally, complaints about side effects of the anti-hypertensive was prevalent among the non-adherent patients, to the extent that some non-adherents stopped their prescribed medication for herbal preparations. The implication is that patients are less likely to remain adherent to treatment if the issue of side effects of anti-hypertensive is not addressed during counselling sessions, as required at the stage two of the conceptual framework.

Close to half the number of the patients identified forgetfulness as the main cause for skipping medication (Figure 4). Forgetting sometime to take medicines has been a challenge among hypertensive patients as reported in Ghana and other countries (Al-Ramahi 2014; Tsiantou et al. 2010; Jin et al.,

2008; Harries et al., 2005). The challenge could be managed using strategies adopted by some of the patients such as placing medicines on dining tables and in cosmetic containers to serve as reminders for overcoming forgetfulness

Conclusions

Based on the results and the discussion, the following conclusions can be made: first, the levels of medication adherence among the group of known hypertensive patients in the Cape Coast Metropolis was low. Secondly, patients' perceptions and beliefs about the cyclical nature of hypertension might have contributed to the low adherence rate in the Metropolis. Misconceptions about appearance of symptoms as indications of high blood pressure suggests poor knowledge about the nature of hypertension among the sample of patients in the Metropolis. Consequently, the misconceptions about symptoms might have also contributed to the low medication adherence in the Cape Coast Metropolis. Fears of adverse effects of the anti-hypertensive medicines and forgetfulness about medication were prevalent among non-adherent patients. The implications for not providing health education to address misconceptions about hypertension and its treatment, could negatively affect medication adherence among patients.

The Self-Regulatory model of illness was the theoretical basis for understanding how perceptions of hypertension influence medication behaviour of the patients. It is evident from the results that the model has been useful in guiding the study to identify the issues which include, misconceptions regarding symptoms and the cyclical nature of hypertension, strategies to overcome forgetfulness, and the proposed plan for restructuring the consultation process.

These are key findings that are expected to add to the existing commentary on hypertension.

Perspectives on the Conceptual Framework

The Self-Regulatory Model provided the framework for assessing patients' perceptions of hypertension. The model posits that when patients are diagnosed of an illness, they build perceptions of the disease and use these beliefs to guide their choices of treatment for the illness or symptoms (Leventhal et al., 1998; 1997). The study used the model to understand how hypertensive patients would try to make sense of their condition, by identifying symptoms and causes that they perceived to represent or associate with their condition.

The illness perception question instrument of the Self-Regulatory Model was used to assess patients' perception of symptoms and causes of hypertension. The instrument has three main components namely, illness representation, identity, and cause. Changes were made to the five-point Likert scale to facilitate analysis. Using mean scores to assess patients' level of perception is misleading as it has the tendency of skewing the results towards high perceptions. Therefore, the scores were indexed into "low", "moderate" and "high" categories, instead of the mean values as originally recommended.

The causal sub-scale of the illness representation tool was used to assess patient's knowledge about the risk factors of hypertension. The scale had attracted criticism from Chen et al. (2009) to the effect that some of the items are not relevant to the cause of hypertension. Though Chen et al. had raised issues about the inclusion of accident or chance, immunity, germs, or virus on the Causal scale, they were maintained in this study to test patients' understanding of the causes of hypertension. The results revealed that more than

80 percent of the patients ruled out the effects of germs and virus as possible causes of hypertension (Table 5). Therefore, the framework has assisted in revealing that some of the patients held erroneous beliefs in the causes of hypertension. The implication is that hypertensive patients who hold beliefs in germs and viruses may seek alternate treatment. This calls for intensification of education at the clinics to address misconceptions. Therefore, the study supports the inclusion of the items on chance, immunity, germs, and virus in order to identify and address misconceptions about the causes of hypertension among patients.

The identity component of the scale which consists of 19 items provided information about patients' perceptions of symptoms. The scale has three sections, namely perceived symptoms, symptoms attributable to hypertension, and symptoms attributable to medication. Responses to these sections were in the form of "yes", "no", and "don't know". Some patients found the section difficult to understand, which resulted in delay. In spite of the challenge, the scale was maintained to assess whether patients' held beliefs about hypertension were different from the medical view. The result showed that every symptom listed on the scale was identified and attributed to hypertension. Whereas hypertension is labelled as symptomless, patients held beliefs in the appearance of symptoms (Table 7).

This finding reinforces the Self-Regulatory Model which states that patients build their own beliefs about an illness which may not be in line with the medical model of the illness. Though perceived symptoms are not medically related to hypertension, it is necessary to assess patients' views in order to address misconceptions.

Studies have shown that constructs of the illness representation predict medication adherence (Horne et al., 2010; Chen et al., 2009; Ross et al., 2004). As found in this study, the significant association between the Timeline Cyclical construct and medication adherence supports the predictive capacity of the Self-Regulatory Model. The underlying deductions show that the Self-Regulatory Model has been useful in guiding the findings of this study.

Contribution to Knowledge

Studies in Ghana have previously focused on determining the prevalence, awareness, and control rates of hypertension in sections of the population (Addo et al., 2012; Bosu, 2010). Others have assessed knowledge, attitude, beliefs, and perceptions of treatment (Boima et al., 2015; Anowie and Darkwa, 2015; Botchway, 2014; Laryea, 2013; Spencer et al., 2005). Results of these studies point to low blood pressure control rates, poor knowledge, attitudes, and misconceptions towards hypertension. According to these reports, the level of medication non-adherence is still high in two-thirds of hypertension patients in Ghana, in spite of available treatment (Boima et al.).

This study has established that the level of anti-hypertensive medication adherence among the sample of patients in the Cape Coast Metropolis is low, corroborating results of other studies which reported low hypertension medication adherence in Ghana. Findings of the sample suggest that less than one-third of hypertension patients receiving treatment in the three hospitals adhere to medication. Additionally, there were misconceptions among patients particularly, the non-adherents about symptoms, and that hypertension occurs on-and-off in cycles. These misconceptions among non-adherents might have contributed to the low rate of adherence in the Metropolis.

It was also found that patients who regularly monitored their blood pressure levels at home had significant improvement in medication adherence. This points to the need to empower patients to undertake blood pressure monitoring at home. Furthermore, coping strategies for overcoming forgetfulness have also been revealed in this study. These involves making medicines visible by placing them on dining tables and in cosmetic containers to serve as reminders. These strategies could address the effect of forgetfulness on medication adherence. The findings regarding home blood pressure monitoring, and the two strategies meant to cope with forgetfulness, may prompt randomised control trials to clearly establish the relationships.

A plan for restructuring the consultation process to be adherence-based, has been proposed. It is in line with the procedure being advocated by the Self-regulatory framework, which requires assessment of patients' adherence levels using appropriate tools to aid treatment. Secondly, the plan advocates a decentralisation of the consultation process by building a team of experts, to provide counselling, education on lifestyle modifications, and self-management practices. The reorganisation would ensure comprehensive assessment of the patient by the mix of experts with different skills.

These findings add to the information needs of clinicians, health educators and promoters for the management of hypertension. The findings could lead to interventions to address misconceptions of hypertension and treatment in the Metropolis. Finally, the results are expected to generate debates for future research studies in hypertension.

Recommendations for Clinical Professional Practice

There are key findings which can help promote effective medication adherence among patients. First the significant association between Timeline Cyclical beliefs and medication adherence reinforces suggestions by the Self-Regulatory Theory that perceptions affect medication adherence (Leventhal et al., 1997). This finding underscores the need for intensification of patient education to address misconceptions of hypertension. The emphasis on compliance-based consultation as shown in figure 5, suggests patients may not receive adequate information about hypertension. Patients could improve adherence if doctors share views on perceived symptoms, treatment, and outcomes, as well as skills on medication adherence. Every patient should be informed at onset that hypertension is a lifelong condition and that medicines ought to be taken continuously even when they sometimes feel well.

The low levels of medication adherence among younger ages compared to those at 70 years, calls for intensification of target counselling for ages below 70 years. Target counselling could improve medication adherence particularly, for those in 40-49 years who were the least adherent. Besides, media education about hypertension and medication adherence needs to be intensified in the population.

It was revealed that the non-adherent patients in particular, combine orthodox treatment and herbal supplements to manage hypertension. However, patients who remained adherent had faith in the anti-hypertensive medication. Even though this study has no evidence of the effectiveness of herbal preparations for the treatment of hypertension, patients should be counselled on

available treatment options, including the appropriate complementary and herbal preparations to reduce the risk of complications.

Patients' fears of side effects of the anti-hypertensive including sexual weakness, cough, palpitation, and insomnia should be addressed. This may be achieved by providing prior information about the potential side effects of the medicines. Doctors and Nurses could make enquiries about patient experiences of side effects in order to address concerns. There is need to create awareness about the potential side effects of anti-hypertensive when interacting with patients on one-on-one basis.

The strategies initiated by some patients to address forgetfulness could be promoted in all the hospitals. Female patients should be encouraged to place their medicines in cosmetic containers where they visit daily to dress. Male patients may be encouraged to place their medicines on dining tables where they visit daily for meals. The underlying philosophy is that patients should place medicines at places which make them visible.

Addressing the levels of medication adherence may begin with reorganisation of the consultation process. The compliance mode of consultation with focus on medication instructions would need to be changed to adherence-based with focus on patient education and empowerment (see figure 5). At the outpatient departments of two of the hospitals, patients were seen by the consulting doctors who were expected to provide treatment, as well as education on lifestyle and self-management skills. The consultation process and counselling by the same medical officer do not seem to be enough. There would be the need to consider a decentralised procedure to involve a one-on-one consultation with the doctor, dietician, health educator, and a physiotherapist.

This would provide ample time for comprehensive assessment of patients. Health centres could consider establishing clinics for hypertension to be managed by a team of professionals comprising a medical officer, a nurse, a nutritionist, nurse educator and an exercise expert. The team would assess individual adherence levels, provide treatment and recommend appropriate lifestyle changes, as well as education and empowerment on self-management skills.

The following is a proposed structured consultation process which is based on the findings of this study and the conceptual framework. The proposed plan was conceived from the patients' perspective, and would need to be discussed with doctors and nurses. The idea has been adapted by two hospitals which are the Abura Dunkwa and the Twifo Atim Morkwa District hospitals, in the Central Region after preliminary results were discussed.

Step 1: ASSESSMENT OF ADHERENCE: Patient's vital signs are measured followed by assessment of medication adherence levels using medication adherence assessment questionnaire. Assessment of patients' adherence levels using specific tools were hitherto not done. There is need to assess patients' levels of adherence to aid treatment. Triage nurses are expected to measure adherence levels with reports to the doctor.

Step 2: CONSULTATION: Patient sees the doctor with reports of vitals and adherence scores. Doctor identifies patient's challenges and recommends treatment with agreement from patient.

Step 3: EDUCATION AND COUNSELLING: Nurse Educator provides information and counselling on medication adherence, expected lifestyle

changes, and Self-Management empowerment skills. This stage is being proposed to be handled by trained counsellors and exercise experts.

Step 4: NUTRITION NEEDS ASSESSMENT-: The Health Nutrition Officer assesses and identifies patients' dietary needs, and agrees on diet plans. This stage is also to be handled by a trained dietician or nutrition officer. The diagrammatic representation of the proposed structure is shown in figure 6. The figure is a summary of the steps 1 to 4.

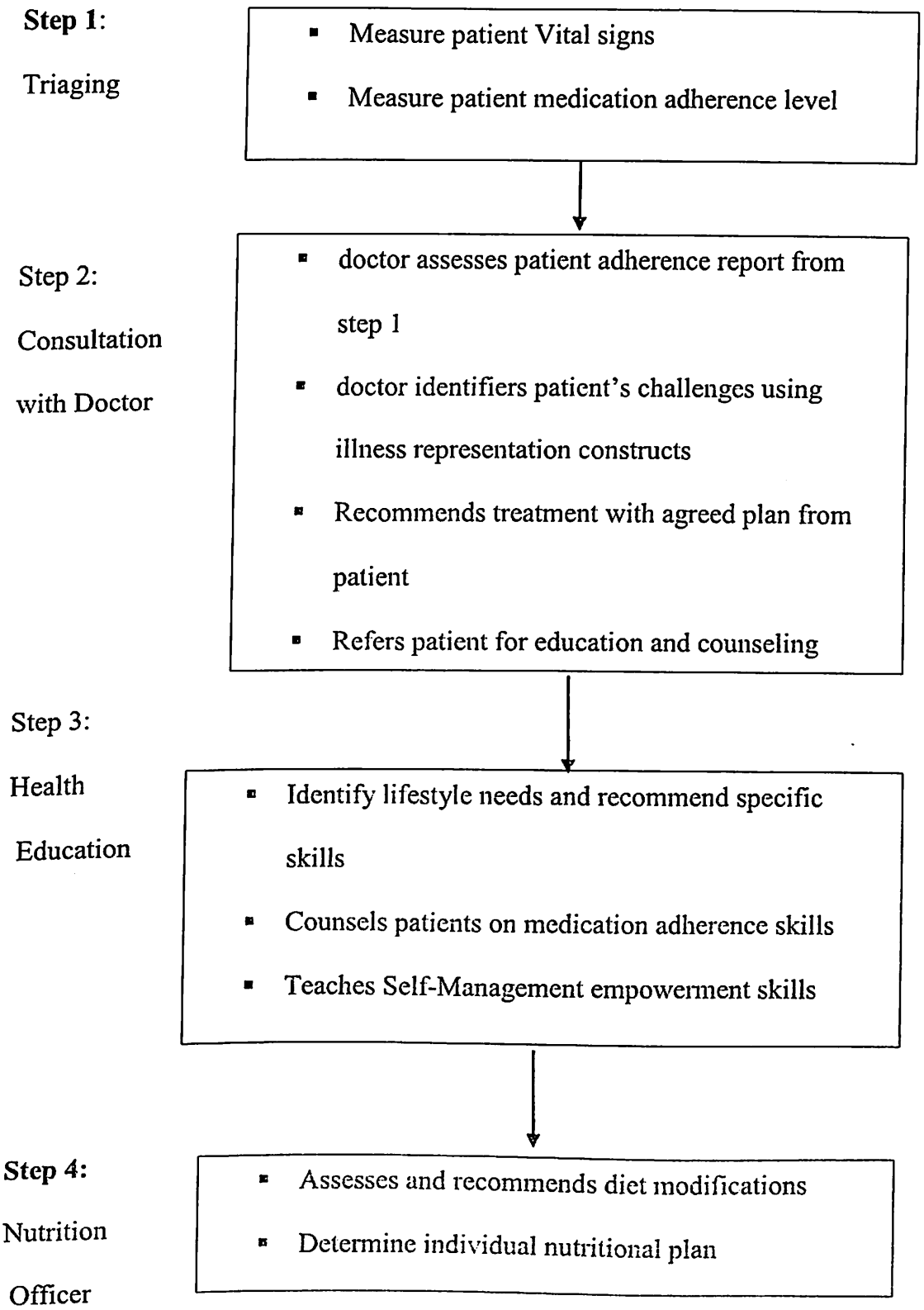

Figure 6: Graphical Presentation of a Proposed Consultation Procedure for Hypertension Management

Source: Derived from the concepts of Medication Adherence and the Self-Regulatory model of illness

Limitations and Suggestions for Future Research

A key limitation of the study was the application of non-probability sampling procedure for selection of respondents. Therefore, the findings cannot be generalised, as a result of the application of the convenience sampling method.

Another limitation relates to the age limit of the sample units at 40 years and above. The cut-off was necessary to ensure that persons who were on permanent treatment were selected. The decision was supported by evidences asserting an increasing incidence of hypertension among older ages (Addo et al, 2012; Gupta 2011; Bosu, 2010). There is further evidence stating that older patients at age 50 years and above have been independently associated with being on permanent anti-hypertensive treatment compared to lower ages (Bosu). Therefore the need for restricting the study to the group of adults at 40 years and above was to avoid selecting patients who may be on temporary treatment.

A third limitation of this study was the failure to include health professionals in the sample of respondents, though the study was patient focused. It would have been appropriate to obtain information on the views of health professionals about issues concerning particularly, the consultation process.

Finally, the sample population was predominantly female (being two-thirds of the respondents). This limits the extent of generalisation across gender, even though some reports point to a more female hypertensive population in Ghana (GHS, 2011). In spite of these limitations, medication adherence could improve if the issues raised in the recommendations are addressed.

On future research, the study may be repeated using probability sampling methods to provide a more generalised assessment of medication adherence in the metropolis. There is a need to obtain information from a representative sample of the population of hypertensive patients in the metropolis, since the convenience sampling approach has limited the findings to the sample.

Any future study of medication adherence may include the adult hypertensive of ages18 years and above with proportionate sampling across gender. This may provide information to address the issues of age and gender differences among hypertensive patients as raised in the literature. Furthermore, health professionals should be part of the discourse regarding patient medication adherence in a future study.

Evaluation of the effectiveness of managing high blood pressure in the three hospitals may provide information to improve patient care. After years of receiving treatment in the three hospitals, there may be a need to assess the quality of life of hypertensive patients in the metropolis.

It would also be advisable for future research to give insights into how self-management practices such as home blood pressure monitoring could be promoted to improve adherence among patients. A randomised control trial is recommended to clearly establish the link between home blood pressure monitoring and improved treatment adherence. The challenge is to empower patients to manage hypertension since it was shown that patients who regularly checked their blood pressure at home were more likely to adhere to treatment.

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APPENDICES

Appendix A: Sample Size Calculation

Yamane's simplified formula $n = N/ [1 + N (e)^2]$

Where:

n = required sample size

N = total hypertensive population = 21,700

e = 5% error of margin

$n = 21,700/ [1+21,700 (0,05^2)]$

n = 21,700/55.25

n = 392.76

Appendix B: *Background data*

Variable	Frequency	Percentage
Gender (n=350)		
Male	117	33.4
Female	233	66.6
Age (n=350)		
Mean age/median	59.8±11.3 / 58.0	
Mean female age	60.3±11.4	
Mean male age	58.9±10.9	
40-49	65	18.6
50-59	127	36.3
60-69	77	22.0
70 and above	81	23.1
Marital Status (n=350)		
Never Married	29	8.2
Married, Living with Spouse	192	54.9
Divorced	129	36.9
Education Level (n=350)		
No Formal Education	83	23.7
Primary (6 years)	183	52.3
Secondary (9-12 years)	38	10.9
Tertiary (>12 years)	46	13.1

Source: Field data (2014)

Occupation (n=350)		
Unemployed/Retired	143	40.8
Professional/Management	51	14.6
Services/Marketing	118	33.7
Agriculture/Fishing	38	10.9
Religious Affiliation (n=350)		
Christian Orthodox	199	56.9
Christian Charismatic	75	21.4
Islam	61	17.4
Other Religion	15	4.3
Anthropometric data (n=350)		
Weight (mean/ s.d)	76.45 ±16.7	
Mean weight Female	76.2±17.0	
Mean weight Male	76.9±15.8	
Height (mean/ s.d)	1.59 ± 0.09	
BMI (mean/sd)	30.1 ± 3	
BMI female (mean/sd)	31.1±6.4	
BMI male (mean/sd)	28.2±5.4	
BMI Range (n=350)		
Underweight (<18.5)	3	0.9
Normal weight (18.5-24.9)	72	20.6
Overweight (25-29.5)	103	29.4
Overweight female	67	65.0

Appendix B continued

Overweight male	**36**	**35.0**
Obese (30.0+)	172	49.1
Obese Female	126	73.3
Obese Male	46	26.7
Blood Pressure control (BP)		
Systolic BP (mean)	149±21.5	
Diastolic BP (mean)	87±11.9	
Mean Female SBP & DBP	149.5±21.2/ 86.52±11.3	
Mean Male SBP & DBP	147.4±22.1/ 86.7±13.1	
% controlled BP (<140/90 mmHg)	83	23.7
% uncontrolled BP (>140/90 mmHg)	267	76.3
% Isolated Systolic BP(>140/<90)	95	27.1
% Isolated Diastolic BP (<140/>90)	30	8.6
Types of Anti-hypertensive prescribed (total prescribed drugs =587)		
Amlodipine	173	29.5
Nifedipine	123	21.0

Bendroflumethiazide	**83**	**14.1**
Losartan	74	12.6
Lisinopril	70	11.9
Atenolol	51	8.7
Ramipril	13	2.2
Class of Anti-hypertensive prescribed (# drugs = 587)		
Calcium channel blockers	296	50.4
Angiotensin receptor blockers	76	12.9
Angiotensin I inhibitors - ACE	81	13.8
Beta Blockers	55	9.4
Diuretics	79	13.5
Number of Anti-hypertensive (n=350)		
# of participants given one anti-hypertensive	147	42.0
# of participants given 2 anti-hypertensive	168	48.0
# of participants given 3 or more anti-hypertensive	35	10.0
# of participants given fixed-combination drugs		

Frequency of dosage (n=350)		
Mean years of medication	6.4	
% on one dose per day	283	81
% on twice daily doses	54	16
% on thrice or more daily doses	8	2
Co-morbidity (n-350)		
Presence of co-morbidity	149	42.6
Other chronic diseases (164)		
Diabetes	128	78.0
Asthma	21	12.8
Depression	10	6.09
Stroke	3	1.8
Sickle cell	2	1.2
Hereditary (n=350)		
% Presence of HPT in family	156	44.6
% Absence of HPT in family	170	48.6
% Don't Know	24	6.8
Lifestyle and Behavioral Factors		
Alcohol Use (n=350)		

Current alcohol consumers	75	21.4
Former alcohol consumers	134	38.3
Never used alcohol	141	40.3
% current male consumers	49	65.3
% current female consumers	26	34.7
% used alcohol in past 7 days	64	85.3
% advised to stop drinking (n=75)	34	45.3%
% adhered to advise to stop alcohol (n=34)	24	70.6
Tobacco use (n=350)		
Current smoker of cigarette	4	1.1
Former smoker	43	12.3
Never smoked	303	86.6
Fruits intake in last 7 days (n=350)		
% who took fruit in last 7 days	281	80.3
Mean days of fruit intake	3.41	
Vegetable intake in last 7 days (n=350)		
% who took vegetables in last 7 days	260	74.3
Mean days of vegetable intake	2.98	

Source: Field data (2014)

Dietary knowledge (n=350)		
% received diet control advice	239	68.3
- received diet counsel and adherent	185	77
- received diet counsel and non-adherent	54	23
% with ability to name one dietary control measure	239	68.3
% observed diet recommendation	212	60.6
% with ability to mention one effect of unhealthy diet	176	50.3
- uncontrolled diet cause of death, diabetes, obesity, hypertension		
% advised to reduce salt intake	179	51.1
Physical Activity(n=350)		
% with no physical activity in last 7 days (0)	230	65.7
% with planned moderate physical activity	120	34.3
% low level physical activity (1-3 days)	54	45
% high level physical activity (4-7) days	66	55
Mean days of moderate physical activity	1.5 ± 2.5	
Mean hour sitting daily without activity	4.3 ± 2.8	
Weight Reduction		
% advised by health worker to lose weight	87	24.9
% adhering to weight reduction strategy	69	19.7

Source: Field data (2014)

Appendix C: Knowledge about Hypertension

Factor	Frequency	%
Duration of hypertension		
mean years of being hypertensive	6.9	
% within 10 year of hypertension	286	81.7
% 11-20 years of hypertension	52	14.9
% 21 years plus with hypertension	12	3.4
Diagnosis of hypertension		
% diagnosed at the hospital	334	95.4
% through personal experience	7	2.0
% told by friends	6	1.7
% diagnosed by herbalist	3	0.9
Knowledge of Normal BP values		
% with correct knowledge of normal BP values	48	13.7
% with incorrect normal BP values	70	20.0
% who did not know normal BP values	232	66.3
Perceived meaning of hypertension		
Excess volume of blood in the body	53	15.1
Disease of obstructed blood vessels	41	11.7
Fast heart beat or palpitation	61	17.4
% don't know	195	55.7
Perceived causes of hypertension		
HPT is caused by excessive worry	49	14.0
HPT is caused by uncontrolled eating habit	34	9.7

HPT is caused by stress	35	10.0
HPT is caused by alcohol intake	11	3.1
HPT is caused by anger	9	2.6
HPT is an inherited disease	9	2.6
% don't know one cause of hypertension	203	58.0
Cultural beliefs about hypertension		
Excess blood in the body or "mogha bordo"	36	
Heart disease or "akoma yere"	17	
Induced by witchcraft	6	
Excessive worries or "adwen-dwen mbordo"	5	
Inherited disease	4	
Stroke related disease	2	
disease related Sudden death	2	
Frequency of dosage (n=350)		
Mean years of medication	6.4	
% on one dose per day	283	81
% on twice daily doses	54	16
% on thrice or more daily doses	8	2
% who did not understand dosage times	5	1

Source: Field data (2014)

Appendix D: Self-Management Practices

Factor	Frequency	Percent
Person responsible for BP control (n=350)		
Faith in the Doctor	215	61
- adherents	54	25
Faith in the Nurse	10	3
- adherents	3	
Patient's personal effort	104	30
- adherent	17	
Family members	8	2
God / Allah	2	0.01
don't know	11	3.1
BP monitoring (n=350)		
% who regularly check BP at home	72	21.0
% checked only at the next visit to hospital	278	79.0
How BP is checked at home		
% who use personal BP apparatus at home	41	12.0
- owned BP monitor and adherent	5	12
% with BP checked by somebody for a fee	8	2.3
% who visit nearby clinic to check BP	9	2.5
% who visit nearby pharmacy to check BP	4	1.1
% BP checked by a nurse in the neighborhood	3	0.9
- checked by nurse and adherent	1	
% who observe signs and symptoms of high blood pressure	7	2.0

Support for patient BP control (n=115)		
support from family members	106	30.3
support from friends	5	1.4
government support	4	1.1
Type of Support (n=77)		
Encouragement	18	5.1
Financial support	59	16.8
Alternate care and herbal types (n=350)		
Respondent who sought alternate care	70	20.0
Respondent who used herbal medicines	56	16
- "adutwumwaa bitters"		
- "duapa herbal mixture"		
- "moringa leaves"		
Combine herbs with pills	37	
Stop pills when I decide to take herbal medicine	1	
Take herbs when pills deplete	5	
I take herbal only preparations	13	
Reasons for using Herbs (n=37)		
to cure hypertension	24	
advised by friends to take herbs	5	
to supplement orthodox medicine	5	
I feel better when I take herbs	2	
to avoid impotency	1	
experienced no improvement with herbal treatment	13	
experienced improved health herbal treatment	6	
Treatment preference (n=70)		
Preference for anti-hypertensive medication	48	
Combination of herbal, or other supplements with anti-hypertensive medication	17	
Preference for herbal medicine only	5	

Source: Field data (2014

Appendix E: Health Care Practices

Factors	Frequency	Percent
Clinical Appointment (n=350)		
2-3 visits per month	159	45.4
once every month	133	38.0
once 2-6 months	58	16.6
Reasons for hypertension		
Told HPT caused by my marital problems	2	
Told HPT was inherited	3	
Told my poor eating habit caused HPT	6	
Told HPT was caused by my worries	4	
told HPT was caused by my alcohol intake	11	
I was not told the cause of my condition	315	
other causes	9	
Patient expectation of timeline (n = 350)		
I expect my condition to cure soon	30	8
I don't know how long to live with condition	289	83
I believe my condition is lifelong disease	31	9
Drug availability		
free drugs from hospital (insurance)	331	94.6
buy at private pharmacy shop	18	5.1
supplied by family and friends	1	0.3

Coping with side effects of medicines		
I use other medicines to support	1	
medicine was changed	1	
skipped taking the medicines	5	
Benefits of treatment		
drugs stops dizziness	8	
drugs slow down heart beat	21	
drugs control high blood pressure	114	
Concerns about treatment		
concerned about taking drugs for long time	5	1.4
medicine is not curing my condition	8	2.3
pill cause fast heart beat	3	0.9
pills affect my sexual life	4	1.1
pills cause frequent urination	3	0.9
pills give me cough	2	0.6
pills give me headache	2	0.6
pills make me weak	4	1.1
Experiences after treatment		
My condition has improved	116	33.1
My blood pressure is stable	46	13.1
Fast heartbeat has slowed	33	9.4
Blood pressure is sometimes high and low	22	6.3
Seen no change in condition	20	5.7

Headache has subsided	9	2.6
Dizziness has subsided	7	2.0
Still experience heart burns	7	2.0
Still experience fast heartbeat	4	1.1
Experience body weakness	3	0.9
Frequent urination has slowed	3	0.9
BP is stable but I experience erection difficulty	2	0.6
Don't know	87	22.3
Other reasons for missing medication		
When my pill depletes before next visit	28	
stop because of sexual weakness	2	
stop because of frequent heartbeat	2	
Action after missing medication		
Continue with medication when I obtain some	23	
Take pill next day I remember	27	
Take pill when I return from journey	11	
Stop for some time to monitor my health	5	
Take as-and-when I feel	9	

Source: Field data (2014

Appendix F: CONSENT FORM

PERCEPTIONS OF HYPERTENSION AND ADHERENCE TO MEDICATION IN THE CAPE COAST METROPOLIS, GHANA

This study is being conducted by a student from the University of Cape Coast. The aim of the study is to know how persons with hypertension are managing to control their high blood pressure. It is also to identify difficulties that they face in managing their condition.

You have been selected to take part in this interview because of your experience with the condition. There is no direct benefit to you as a participant. However, the information I collect can be used to improve the quality of services provided to persons with hypertension in the community.

You will be asked some questions about your knowledge, beliefs and perceptions about hypertension. The risk of this study is minimal. If you do not wish to answer any of the questions included in the survey, you may skip them and move on to the next question. You have the option to stop at any point in time if you do not feel comfortable, but this will not jeopardise our relationship. We will interview you again in three months to find out how you are doing.

The information recorded will remain confidentially and will not be disclosed to anyone. I will protect information about you to the best of my ability. Besides, your name is not needed since it is confidential and you will not be named in any reports. The form will be kept in a safe place and will be available to only the researcher and supervisor. The form will be destroyed after two years of this study. The interview will last about 45 minutes.

If you agree to participate in this study, you can indicate your agreement by signing this form or simply state your agreement. If you have any questions

about this study at any time you can contact the Institutional Review Board Office, through the landlines 0332135351/0289670793(4). You may also contact the head of department, Population and Health through mobile number 0244255234 / 03321-30416 when necessary.

VOLUNTEER AGREEMENT

The benefits, risks and procedures for the research have been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date .....

Name and signature or mark of volunteer/thumbprint .....

Verbal consent.....(to be indicated by interviewer)

Volunteers who cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

Date ..... Name and signature of witness .....

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Name/Signature of Person interviewer

Date

Appendix G: QUESTIONNAIRE

Topic: Perceptions of Hypertension and Adherence to Medication in the Cape Coast Metropolis, Ghana.

Background Characteristics

1. Gender: Male [ ] Female [ ]
2. Age (completed yrs): .....
3. Place of residence/community: ...Urban [ ] Peri-urban [ ] Rural [
4. Marital Status: Single [ ] Married [ ] Divorced [ ] Widow/er [ ]
5. Level of Education: Not at all [ ] Primary [ ] Secondary [ ] Tertiary [ ]
6. Average monthly income .....
7. Occupation: Unemployed [ ] Civil Servant [ ] Trader [ ] Farming [ ] Fishing [ ] Retired worker [ ] Artisan [ ] other
8. Religion: Christian [ ] Moslem [ ] Traditional [ ] No Religion [ ] other...

Clinical Information

9. Weight: ...kg Height: ...m Body Mass Index (BMI) kg/m2
10. Blood Pressure: Systolic (BP):....mmHg Diastolic(BP): .....mmHg
11. Type of antihypertensive medication Co-morbidity Diabetes [ ] depression [ ] Asthma [ ] other.....
12. Family Clinical History: Diabetes [ ] Hypertension [ ] Diabetes and Hypertension [ ] other .....

Lifestyles factors

Smoking

13. Do you currently smoke cigarette? Yes [ ] No [ ]

a. If yes, how many sticks/day in the last 7 days .....

b. If no, have you ever smoked cigarette? Yes [ ]

c. How many sticks per day .....

14. What do you consider to be some of the effects of smoking?.....

Alcohol use

15. Do you currently take alcohol beverages? Yes [ ] No [ ]

16. In the last 7 days, did you drink any alcoholic beverage Yes [ ] No [ ]

17. If yes, how many bottles/day .....beverage type.....

18. Did you use to take alcoholic drinks? Yes [ ] if you did, how many bottles/day ..... and type..... No [ ]

19. What do you consider to be some of the effects of taking alcoholic beverages?.....

Exercise

20. In the last 7 days, how many days did you exercise (at work, home) that lasted for at least 20 minutes each time? Number of days ....Don't Know [ ]

a. What type of exercise do you regularly do? Walking [ ] Swimming [ ] `Cycling [ ] Jogging [ ] other.....

b. If no, why are you not able to exercise?.....

21. What are some of the benefits of regular physical exercise?

a..... .....

b.....

22. What are some of the dangers of not exercising?.....

Diet

23. In a typical week, how many days do you eat fruits, for example mangoes, `pawpaw, banana, orange, watermelon. Number of days..... Number of times per day..... Not sure [ ]

24. If no, why do you not take fruits?.....

25. In a typical week, how many days do you eat vegetables, for example carrots, cabbage, dark green leafy vegetables e.g. kontomire etc? Number of days.....Number of times per day..... Not sure [ ]

26. If none, why do you not take vegetables?.....

27. Do you follow a special diet to aid control your hypertension?

28. None [ ] Low calorie [ ] low fat [ ] low salt [ ] other...

29. If no why?.....

30. What relationship exists between diet and hypertension? .....

Self-Care Behaviour

31. How long have you been Hypertensive?.....

32. How did you know about your condition?.....

33. Can you explain the nature of your condition?.....

34. What do you belief might cause your condition? .....

35. Do you know the values of normal blood pressure? Yes [ ]..... No [ ]

36. Who is responsible for ensuring your blood pressure is controlled Responsibility is with the Doctor/Nurse [ ] Responsibility is with me [ ] other [ ].....

37. Has the doctor taught you how to manage your condition at home? Yes [ ] No [ ]

38. How long have you been taking medication? Months [ ]...years [ ]...

39. How often has your doctor told you to take this medicine? Everyday [ ]

as needed [ ] Don't know[ ]

40. Do you take your medications as prescribed? Yes [ ] No [ ]

41. If no, what are your reasons for missing medication?

42. What do you do when you miss a dose of your edications?.....

43. If you feel better, do you stop taking your medication? Yes [ ] No [ ]

44. Do you use other alternate medicines aside the prescribed medication?

Yes [ ] name of medicine.....No [ ]

45. How often have you used herbal medicines? Once [ ] Few Times [ ]

Regularly [ ]

46. What are your reasons for using herbal supplements? .....

47. Do you use monitors to check your BP at home? Yes [ ] No [ ]

48. Have you experienced any change in your daily life after diagnosis and

the treatments for hypertension? Yes [ ] No [ ]

49. Do you get support from family, friends and colleagues in managing

your condition? Yes [ ] what form.....No [ ].....

50. What do people around you say about your illness?.....

51. What are some of your cultural beliefs surrounding the disease?

Health Care System Factors

52. How often do you visit the hospital to see your doctor/Nurse? ....

53. Did the prescriber discuss with you what might be the cause? Yes [ ] No

54. Did the doctor tell you how long you could expect to have this problem?

Yes [ ] No [ ]

55. Did the prescriber give you clear instructions about your treatment, what

to do, when, how often, and for how long? Yes [ ] No [ ]

56. Did the prescriber tell you what you might expect when taking your medication/treatment? Yes [ ] No [ ]

57. Did the prescriber give you some tips to help you work your treatment into your daily routine? Yes [ ] No [ ]

58. Did the prescriber tell you how to monitor your problem to see if the treatment is working? Yes [ ] No [ ]

59. Do you receive all prescribed medicines? Yes [ ] No [ ]

60. How do you refill your drugs? a. Obtain free drugs from hospital (NHIS) [ ] b. Buy at the pharmacy shop [ ] other.....

61. How much does it cost for a single course in a month?

a. GHC..... b. Covered by NHIS [ ]

62. Does cost affect or reduce your required medication? Yes [ ] No [ ]

Appendix G, continued

Morisky Medication Adherence Questionnaire

	Question	Yes	No
1	Do you sometimes forget to take your high blood pressure pills?		
2	Over the past two weeks, were there any days when you did not take your high blood pressure medicine?		
3	Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?		
4	When you travel or leave home, do you sometimes forget to bring along your medications?		
5	Did you take your high blood pressure medicine yesterday?		
6	When you feel like your blood pressure is under control, do you sometimes stop taking your medicine?		
7	Do you ever feel hassled about sticking to your blood pressure treatment plan?		
8	8. How often do you have difficulty remembering to take all your blood pressure medication? a. Never/rarely - 4 [ ] b. Once in a while - 3 [ ] Sometimes – 2 [ ] Usually - 1 [ ] All the time - 0 [ ]		

Source: Morisky D.E., Alfonso. A., Krousel-Wood, M., Ward H. (200).

Appendix G, continued

Illness Perception Questionnaire for Hypertension

Please, show how much you agree or disagree with each of the following statements about your high blood pressure by ticking one of the boxes:

code	Views about hypertension	A	B	C	D	E
er5	Having this high blood pressure makes me feel anxious					
ti5	I expect to have this high blood pressure for the rest of my life					
er1	I get depressed when I think about my high blood pressure					
cy4	I go through cycles in which my high blood pressure gets better and worse					
cq6	My high blood pressure causes difficulties for those who are close to me					
cq5	My high blood pressure has serious financial consequences					

A-Strongly Disagree, B-disagree, C- Neither agree nor Disagree, D-Agree, E-Strongly agree

cp5	I have the power to influence my high blood pressure					
cq1	My high blood pressure is a serious condition					
cp3	The course of my high blood pressure depends on me					
ti2	My high blood pressure is likely to be permanent rather than temporary					
cy3	My high blood pressure is very unpredictable					
er6	My high blood pressure makes me feel afraid					
er3	My high blood pressure makes me feel angry					
cq4	My high blood pressure strongly affects the way others see me					
ti6	My high blood pressure will improve in time					
cq2	My high blood pressure has major consequences on my life					

cp 2	What I do can determine whether my high blood pressure gets better or worse					
ti3	My high blood pressure will last for a long time					
ct4	My treatment can control my high blood pressure					
ct2	My treatment will be effective in curing my high blood pressure					
er2	When I think about my high blood pressure I get upset					
ch 5	I have a clear picture or understanding of my high blood pressure					
ct3	The negative effects of my high blood pressure can be prevented (avoided) by my treatment					

J. Clatworthy, R. Horne, D. Buick, & J. Weinman, Centre for Health Care Research, University of Brighton, 1 Great Wilkins, Falmer, Brighton, BN1 9PH, UK.

Your Views about Symptoms You may have Experienced

For each symptom that you have experienced recently, please show whether you believe it is related to your HIGH BLOOD PRESSURE or to the MEDICINE you take for your high blood pressure

	Symptom	I have experienced this symptom recently		If answer is YES		This symptom is related to my HIGH BLOOD PRESSURE				This symptom is related to the MEDICINE I take for my high blood pressure		
ic1	pain	no	Yes	if yes →	i1	yes	No	don't know	rm1	yes	no	don't know
e2	sore throat	no	yes	if yes →	ri2	yes	no	don't know	rm 2	yes	no	don't know
c3	nausea	no	yes	if yes →	ri3	yes	no	don't know	rm 3	yes	no	don't know
4	breathlessne	o	cs	f ~~yes~~	i4	cs	no	don't know	rm 4	es	o	d on't know
c5	weight loss	o	es	→ f yes	i5	es	o	don't knowD	m 5	es	o	don't know
e6	fatigue	o	cs	~~f yes~~	i6	es	o	on't know	m 6	es	o	don't know
e7	stiff joints	o	es	~~f yes~~	i7	es	o	on't know	m 7	es	o	don't know
e8	sore eyes	o	es	~~f yes~~	i8	es	o	on't know	m 8	es	o	don't know

e9	wheeziness	o	es	~~f yes~~	i9	es	o	don't know now	m 9	es	o	don't know
e10	headaches	o	es	~~f yes~~	i10	es	o	don't know	m 10	es	o	don't know
e11	upset	o	es	~~f yes~~	i11	es	o	don't know	m 11	es	o	don't know
e14	loss of	o	es	~~f yes~~	i14	es	o	don't know	m 14	es	o	don't know
e15	loss of	o	es	~~f yes~~	i15	es	o	don't know	m 15	es	o	don't know
e16	impotence	o	es	~~f yes~~	i10	es	o	don't know	m 16	es	o	don't know
e17	feeling	o	es	~~f yes~~	i11	es	o	don't know	m 17	es	o	don't know
e18	fast heart	o	es	~~f yes~~	i12	es	o	don't know	m 18	es	o	don't know
e19	pins and	o	es	~~f yes~~	i13	es	o	don't know	m 19	es	o	don't know

Source: J. Clatworthy, R. Horne, D. Buick, & J. Weinman Centre for Health Care Research, University of Brighton, 1 Great Wilkins, Falmer, Brighton, BN1 9PH, UK.

	Possible Causes Of Your High Blood Pressure	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
CA1	Stress or worry					
CA2	Hereditary - it runs in my family					
CA3	A Germ or virus					
CA4	Diet or eating habits					
CA5	Chance or bad luck					
CA6	Poor medical care in my past					
CA7	Pollution in the environment					
CA8	My own behaviour					
CA9	My mental attitude e.g. thinking about life negatively					
A10	Family problems or worries					
A11	Overwork					
A12	My emotional state e.g. feeling down, lonely, anxious, empty					
A13	Ageing					
A14	Alcohol					
A15	Smoking					
A16	Accident or injury					
A17	My personality					
A18	Poor immune system					

Appendix H: In-depth interview Guide

A. **Perceptions and beliefs about hypertension**

1. *Comment:* We are interested in your views about high blood pressure.

Questioning: In your view could you mention the most important factors or reasons that you believe caused your high blood pressure?

Probe: Tell me how you got to know about your condition?

Probe: What concerns you most about your current condition?

Probe: what other concerns do you have?

2. *Comment:* We would like to ask you about any Symptoms you might have experienced since finding out about your high blood pressure.

Questioning: What are some of the symptoms which you experience and attribute to your blood pressure?

Probe: Probe for other symptoms not spontaneously mentioned e.g. *Headache, dizziness, fatigue, stiff joints, sleep difficulties, fast heart rate, flush, breathlessness*).

Questioning: Why do you attribute those symptoms to your blood pressure?

Questioning: When you experience those symptoms, what do you do?

3. *Comment*: We are interested in your own views about what caused your high blood pressure.

Questioning: What in your view might have let to development of your high blood pressure?

Comment: Now let us talk about your last experience.

Questioning: When did it occur?

Questioning: What do you think triggered it?

Probe: What do you do to control it? What else?

B. **Perceptions and beliefs about treatment and adherence**

1. *Comment:* We are interested in your beliefs about the treatment that you have been practicing in order to cure the disease.

Questioning: What types of therapies have you been practicing?

Probe: What other treatments do you practice?

Questioning: Why do you prefer those treatments?

Questioning: What are your beliefs in the types of medicines you take?

2. *Comment:* Some people often experience adverse effects of the anti-hypertensive medicines they take, others do not.

Questioning: Tell me about your experience with the medicines you take.

Questioning: What adverse effects do you experience when you take those medicines?

Probe: Probe for other effects not mentioned, e.g. *loss of libido, impotence, Nausea, pain, sore throat, breathlessness, weakness, sore eyes, weight loss, wheeziness, pins and needles, sleep difficulties, headache*)

Questioning: Why do you attribute those effects to the medicine?

3. *Comment:* Some people are able to follow strictly, the drug instructions in terms of the quantity and times to take these medicines, but others find it difficult to comply with the instructions.

Questioning: Let us talk about your experience with adherence. What would you consider to be your difficulties with following drug instructions?

Probe: what will you consider to have been the factors which have facilitated your adherence?

Probe: what will you consider to have been the factors or reasons why you cannot strictly follow prescription instructions?

Questioning: If there was one thing you could change about the treatment your doctor prescribes for you, what would you suggest?

Questioning: What are some of the things that you will suggest to improve adherence among patients? [*Probe for reasons*]

C. **Perceptions about modifiable lifestyle factors**

1. *Comment:* Please, we are interested in your views about lifestyle practices and control of high blood pressure.

Questioning: There are some things you have been told by the Doctor to do and not to do in order to control blood pressure, what are they?

Probe for the following if not mentioned: *physical exercise, smoking of cigarette, alcohol intake, salt intake, overwork or stress, family problems or worries?*

2. *Comment:* Some people have difficulties coping with these lifestyle factors but others are able to observe them. Tell me about some lifestyle challenges and the skills one can adopt to overcome these challenges.

Questioning: what are the some of the challenges?

Questioning: what skills have you adopted to deal with the challenges?

Probe: why did you adopt the skills?

Questioning: Finally, is there anything further about the management of your condition that, you could share with me?

Thank you.

Appendix I: Abridged Curriculum Vitae of Research Assistants

RESEARCH ASSISTANT

Name: **EBENEZER OSEI BONSU**

Address: **DISTRICT HOSPITAL, ABURA DUNKWA, P.O.BOX 55, ABURA DUNKWA**

Mobile: 0243205220

Educational Background:

NURSES' AND MIDWIVES TRAINING COLLEGE DIPLOMA-NURSING 2003-2006

Employment Records:

Ghana Health Services STAFF NURSE 2011

Membership of Professional Body(ies):

GHANA REGISTERED NURSES ASSOCIATION

Abridged Curriculum Vitae

RESEARCH ASSISTANT

Name: **BAIDEN EMMANUEL**

Address: **DISTRICT HOSPITAL, ABURA DUNKWA , P.O.BOX 55, ABURA DUNKWA**

Telephone (s):

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Educational Background:

1. **COLLEGE OF HEALTH, KINTAMPO DIPLOMA-TECHNICAL OFFICER, HEALTH INFORMATION 2006-2009**

Employment Records:

Ghana Health Services TECHNICAL OFFICER 2010

Membership of Professional Body(ies):

GHANA ASSOCIATION OF PUBLIC HEALTH TECHNICAL OFFICERS (GAPHTO)

Appendix J: Institutional Approval for the Study

CENTRAL REGIONAL HOSPITAL

In case of reply the reference number and the date of this Letter should be quoted

GHANA HEALTH SERVICE
Your Health - Our Concern

P. O. Box 1363
Cape Coast
Tel: 03321-34010-14
Fax: 03321-34016

OUR REF.: CRH/ADM – G/364/2013
YOUR REF.:

7th January, 2013

THE HEAD OF DEPARTMENT
POPULATION & HEALTH STUDIES
UNIVERSITY OF CAPE COAST
CAPE COAST

Dear Sir,

COLLECTION OF DATA FOR THE WRITING OF THESIS
(RE: MR. JULIUS WAAMSASIKO ADONG – PhD STUDENT)

This is to acknowledge receipt of your letter dated 10th September, 2012 on the above named subject and wish to inform you the Hospital's acceptance which is dependant on the following:

- That, the student should obtain ethical clearance from the University of Cape Coast
- That, the name of the supervisors of the student must be known to the hospital
- Submission of a copy of the final work to the hospital.

Trusting for your co-operation.

Yours faithfully,

31/01/13

MR. E. ADJEI-ERIMPONG
(HOSPITAL ADMINISTRATOR)
FOR: MEDICAL DIRECTOR

UNIVERSITY OF CAPE COAST
CAPE COAST, GHANA

UNIVERSITY HEALTH SERVICES

Telephone: 042-32440/32480 Direct 23447
Telex: 2552, UCC, GH.
Telegrams & Cables: University, Cape Coast

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref.:

Your Ref.:

7th January, 2013

The Head of Department
Department of Population and Health
Faculty of Social Science
UCC

Dear Sir,

RE: LETTER OF INTRODUCTION (MR. JULIUS WAAMSASIKO ADONG)

We refer to your letter DPH/G.3/32 dated 10th September, 2012, introducing the above mentioned student, to the Directorate of University Health Services as a PhD student of the Department of Population and Health wishing to collect data from our outfit for the purpose of writing his thesis.

We write to kindly inform you that the Directorate has agreed to assist Mr. Adong in the collection of his data.

He should be informed to contact the Hospital Administrator at his earliest convenience.

Thank you.

Yours faithfully,

MR. ATTA YEBOAH-SARPONG
ASST. REGISTRAR/HOSP. ADM'TOR
For Director

GHANA HEALTH SERVICE

CAPE COAST METROPOLITAN HOSPITAL

In case of reply the number and the date of this letter should be quoted.

P. O. BOX 174
CAPE COAST
CENTRAL REGION - GHANA.
Tel/Fax: 03321-32163 / 32161, 32
Email: ghsccmh@yahoo.com

My Ref. No. ...CCMH/G.....
Your Ref. No. .....

Date: 17th December, 2012.

TO WHOM IT MAY CONCERN

LETTER OF CONFIRMATION

I wish to confirm that, management has accepted to allow MR. Julius Waamsasiko a PHD student from University of Cape Coast (UCC) to collect data from the hospital on the topic **Adherence to Hypertension Therapies in Cape Coast Metropolis, Ghana".**

Thank you.

DR D.G. DEMANYA
[MEDICAL SUPERINTENDANT]

Appendix K: Ghana Health Service Ethical Clearance

GHANA HEALTH SERVICE ETHICAL REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax – 233-302-685424
Email: nanatuesdaykad@yahoo.com

My Ref. :GHS-ERC:020713-1
Your Ref. No.

1st October, 2013

Julius Waamsasiko Adong
Ankaful Psychiatric Hospital
Cape Coast

ETHICAL CLEARANCE - ID NO: GHS-ERC: 02/07/13

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Adherence to hypertension therapies in Cape Coast metropolis, Ghana"

This approval requires that you submit an Inception and Mid-term reports of the study to the Ethical Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification of the project must be submitted to the ERC for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your mother organization before any publication of the research findings.

Please always quote the protocol identification number in all future correspondence in relation to this protocol

SIGNED.....
PROFESSOR FRED BINKA
(GHS-ERC - CHAIRMAN)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra