University of Ghana http://ugspace.ug.edu.gh

SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA, LEGON

ADHERENCE TO ANTI-HYPERTENSIVE MEDICATION AMONG ADULTS ATTENDING OUT-PATIENTS CLINIC AT THE MAAMOBI GENERAL HOSPITAL.

BY

EDINAM ABENA VOEGBORLO

(10404559)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE, APPLIED HEALTH SOCIAL SCIENCES DEGREE.

JULY, 2018.

University of Ghana http://ugspace.ug.edu.gh

DECLARATION

I, Edinam Abena Voegborlo, declare that except for other people's work which I have duly acknowledged, this dissertation is the result of my own original work, and that this dissertation, either in whole or in part has not been presented elsewhere for another degree.

…… **Date……**

Edinam Abena Voegborlo

(Student)

…… **Date……**

Dr. Collins Ahorlu

(Academic supervisor)

University of Ghana http://ugspace.ug.edu.gh

DEDICATION

I dedicate this dissertation to the Almighty God for His abundant grace and my mum Doris Ahiafor for her love and support.

University of Ghana http://ugspace.ug.edu.gh

ACKNOWLEDGEMENT

I want to first and foremost thank the Lord God Almighty for seeing me through this stage of my life, and my family and friends for helping me come this far with their prayers and support.

I acknowledge the immense contributions, corrections and productive criticisms of my supervisor Dr. Collins Ahorlu.

My sincerest gratitude to my uncle Mr. Francis Ahiafor and Very Rev. Fr. Nicholas Larsey for the support, advice, counsel and encouragement.

My gratitude to the Management and nurses at the Outpatients' Clinic of the Maamobi General Hospital for allowing me carry out the research at the hospital.

I am grateful to all my classmates for their contributions and suggestions during this whole period.

Last but not the least, to the board of Archbishop Andoh Educational Fund and the Vicar General, Very. Rev. Fr. Francis Adoboli.

University of Ghana http://ugspace.ug.edu.gh

ABSTRACT

Hypertension is one of the non-communicable diseases that is on the rise and has been recognized as a major public health problem that is associated with relatively low levels of awareness, drug treatment, and blood pressure control. Treatment adherence is the degree of compliance with prescribed therapeutic measures, which can be medicinal or not, aiming at maintaining blood pressure levels. This study sought to determine the level of adherence among adults attending the outpatients' clinic of the Maamobi General Hospital. The study employed a descriptive cross sectional research design and quantitative research approve which was used in converting data into numerical form so that the data could be analysed. A structured questionnaire was randomly distributed to 417 hypertensive outpatients 18 years and above out of the population that visited the hospital. The primary data collected was coded and entered in a Microsoft Excel 2010 spreadsheet and STATA version 15. Percentages, frequency tables, pie chart, and cross tabulations were the statistical tools used for describing the data while Multiple Logistic Regression and Chi-squared Test were used to analyze the data. The results obtained demonstrated that socio-demographic and clinical characteristics of hypertensive patients respectively affect the adherence to medication as well barriers that inhibit adherence to medication treatment among which side effects of medication in take was principal. It was found out that the level of adherence to antihypertensive medication among these adults was 68.45%.

University of Ghana http://ugspace.ug.edu.gh

TABLE OF CONTENTS

University of Ghana http://ugspace.ug.edu.gh

University of Ghana http://ugspace.ug.edu.gh

University of Ghana http://ugspace.ug.edu.gh

University of Ghana http://ugspace.ug.edu.gh

LIST OF TABLES

University of Ghana http://ugspace.ug.edu.gh

LIST OF FIGURES

University of Ghana http://ugspace.ug.edu.gh

LIST OF ABBREVIATIONS

ABBREVIATIONS	MEANINGS
CV	Cardiovascular
CVD's	Cardiovascular Diseases
HTN	Hypertension
SBD	Systolic Blood Pressure
DALYS	Disability Adjusted Life Years
NCD	Non Communicable Diseases
WHO	World Health Organisation
MNA	Medication Non-Adherence
MEMS	Medication Electronic Monitoring System
OPD	Outpatients Department
MGT	Morisky Green Test
DBP	Diastolic Blood Pressure
GBD	Global Burden of Disease

University of Ghana http://ugspace.ug.edu.gh

CHAPTER ONE

INTRODUCTION

1.1 Background

Hypertension is one of the non-communicable diseases that are on the rise. Hypertension has been recognized as a main public health problem that is affiliated with relatively low levels of awareness, drug treatment, and blood pressure control (Addo et al., 2012). Epidemiological data obtained in more than 25 countries indicate that in 2025, over 1.9 billion people aged 18 to 91 years are most likely to have hypertension (WHO, 2008). Nonetheless, this number may be even higher, because it is an asymptomatic disease and it is thus under investigated. Globally, the pervasiveness of hypertension is highest in Africa, and 46 percent for both sexes. The lowest prevalence is in the Americas at 35 percent for both sexes (WHO, 2016). A study on Global Burden of Disease has placed a renewed research interest on the socio-economic burden of hypertension across all regions in the world (Danaei et al., 2011).

Hypertension is assessed to cause 7.5 million deaths, about 12.8 percent of the overall universal deaths, accounting for 57 million disability adjusted life years (DALYS). (WHO, 2016). In Africa, non-communicable diseases including hypertension have become the leading causes of preventable deaths (Hussein, 2014). It has been projected that 75% of deaths in sub-Saharan Africa will be attributable to hypertension by the year 2020 with higher mortality in urban than in rural areas (Assah & Mbanya, 2009).

Non-communicable diseases such as hypertension, stroke, diabetes and cancers have become the lead causes of death in Ghana (Agyei-Mensah & De-Graft Aikins, 2010). The management of

University of Ghana http://ugspace.ug.edu.gh

hypertension if effective will result in a decline of cardiovascular (CV) risk, prevention of cardiovascular complications, improve of well-being and quality-of-life (Pagliaro, Santolamazza, Rubattu, & Volpe, 2016). One reason for uncontrolled blood pressure and hypertensive-related complications and mortality is non-adherence to treatment. This has therefore led to renewed global interest in treatment adherence as a studies have shown that the danger of all-cause death, stroke, or acute myocardial infarction was naturally lower in patients with good adherence, (Esposti et al., 2011; Lee, Jang, & Park, 2017).

Adherence is key to therapeutic success; however, it is a multifaceted issue and should not be considered as a dichotomous variable (adherent versus non-adherent). However, medication adherence can be defined as the process by which patients take their medications as prescribed and it is a dynamic process that changes over time. Adherence consists of three components, which need to be considered separately: initiation, implementation and persistence. (Vrijens, Antoniou, Burnier, & Sierra, 2017).

1.2 Problem statement

According to the latest Ghana Health Service Report 2017 for the year 2016 under review, the prevalence of adult hypertension in Ghana appears to be increasing and ranges from 19% to 48%. Current studies have identified that, up to 70% of persons identified to have hypertension are not on treatment and only 13% of those with hypertension have their blood pressures well controlled. In the Greater Accra Region of Ghana, hypertension elevated from fourth to become second to malaria as the main cause of outpatient morbidity. This disease affects the most productive age group (MOH, 2014). In recognizing the burden of NCDs, a national policy

University of Ghana http://ugspace.ug.edu.gh

guideline was developed in Ghana to increase screening services for hypertension at both community and health facility level (MOH, 2011). This was because a community-based prevalence survey in Ghana has shown that about 70% of individuals living with hypertension do not know they have these conditions (Bosu, 2012).

However, when individuals with hypertension are revealed and put on treatment, adherence is essential to achieve optimal blood pressure and prevent complication such as stroke. This notwithstanding, a study in Ghana has showed that stroke resulting from uncontrolled hypertension is the leading cause of admission and death in the Greater Accra region. CVDs are the main cause of NCD-deaths ranging from 35,000 deaths or 15% of the total deaths (MOH, 2014). Hence, adherence to treatment is very important to achieve blood pressure control. This study is therefore designed to determine factors that can influence adherence to treatment.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study is to determine patients' adherence to anti-hypertensive treatments in adults attending outpatient clinic at the Maamobi General Hospital.

1.3.2 Specific Objectives

The specific objectives of this study are:

1. To assess the relationship between socio-demographic characteristics of hypertensive patients and their adherence to antihypertensive treatment.
2. To examine the association between clinical characteristics of hypertensive patients and their adherence to antihypertensive treatment.

University of Ghana http://ugspace.ug.edu.gh

3. To identify the main barriers that inhibit adherence to anti-hypertensive medication.

1.4 Research Questions

The research questions for this study are:

1. What is the relationship between socio-demographic characteristics of hypertensive patients and their adherence to antihypertensive treatment?
2. What is the association between clinical characteristics of hypertensive patients and their adherence to antihypertensive treatment?
3. What are the factors that inhibit adherence to anti-hypertensive medication?

1.5 Justification of Study

Hypertension has been described as a silent killer because many people with the condition are unaware they have the condition. When it is diagnosed, it can be managed with regular intake of medication which is required to prevent complications. Although, different studies across the world have reported on the prevalence of adherence to treatment as well as some other research works carried out in Ghana, a lot is left to be known about the hypertension situation at specific places and health facilities in the country. For instance, a research carried out by (Ankrah et al, 2016) and some other works have established that patients' forgetfulness to take medicines, perceived stigmatization due to disclosure, financial barriers and adverse drug reactions associated with some of the medications as the blockades to medication adherence, much knowledge is desired to be gleaned about the occurrence at particular places so as ascertain the exact situation at these places. This study will therefore provide evidence required to design interventions that may lead to increase adherence which prevents fatal complications in hypertension.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the review of the existing literature and seeks to review briefly some studies that have been carried out on adherence to anti-hypertensive medication among adults attending out-patients' clinics in developed and developing countries.

2.1 Definition and Types of Hypertension

Hypertension is defined as an inflated systolic blood pressure (SBP), diastolic blood pressure (DBP) or as BP in excess of 140/90 mm Hg (Jolobe, 2012; Peco-Antić, 2008; Schiffrin, Calhoun, & Flack, 2016). There are two main types of hypertension; primary and secondary hypertension. Primary also known as requisite hypertension, is the main form of high blood pressure and cause about 90-95% of cases but has no single attributable cause and likely causation include genetic and environmental factors (Omboni et al., 2016). Secondary hypertension on the other hand is high blood pressure that is caused by another medical condition or treatment. (Omboni et al., 2016). Using the normal blood pressure of 120/80mmHg, an individual blood is often given some classification depending on both systolic (SBP) and diastolic blood pressure (DBP) readings according to Table 2.1. (Giles, Materson, Cohn, & Kostis, 2009). From Table 2.1, prehypertension is not a disease category, however, the individual has a higher risk without healthy lifestyle.

University of Ghana http://ugspace.ug.edu.gh

Table 2.1: Classification of Hypertension

Classification	Systolic Blood Pressure (SBP)	Diastolic Blood Pressure (DBP)
Normal	<120 mmHg	<80 mmHg
Pre-Hypertension	129-139 mmHg	80-89 mmHg
Stage 1 Hypertension	140-159 mmHg	90-99 mmHg
Stage 2 Hypertension	≥ 160 mmHg	≥ 100 mmHg

Source: (Giles et al., 2009)

2.2 Management of Hypertension

Hypertension can be managed either by the use of lifestyle modifications or medications. The lifestyle modifications involve dietary changes and exercises. An individual with hypertension is required to reduce intake of saturated fat and dietary salt. The individual is also counseled to increase taking in of fruits and vegetables and whole grains (Nguyen, Odelola, Rangaswami, & Amanullah, 2013). The Dietary Approaches to Stop Hypertension (DASH)-sodium trial randomized subjects to either the DASH diet (rich in fruits, vegetables, and low-fat dairy and reduced in saturated and total fat) or a manage diet (typical United States (US) diet which is high in fat and low in fruits, vegetables, and dairy products) which was conducted in the US showed that both SBP and DBP could be reduced with adherence to dietary regime on management of hypertension (Bray et al., 2004).

Another non-drug approach to controlling hypertension among people with high blood pressure is physical exercise. Regular exercise has been found to be essential in reducing blood pressure (Cardoso et al., 2010). An individual blood pressure can be reduced by 5-8 mmHg following an

University of Ghana http://ugspace.ug.edu.gh

exercise of 6-8 hours a week (Fagard & Cornelissen, 2007). The third non-medication strategy to manage hypertension is reduction in alcohol consumption (Sesso, Cook, Buring, Manson, & Gaziano, 2008). Hypertension can also be managed using medications and this is the focus of this study as adherence is measured as a function of the individual ability to take medication as prescribed. Several medications are available for treating hypertension. The most common medications include; Alpha-adrenoceptor blocking drugs, Angiotensin-converting enzyme inhibitors, Angiotensin-II receptor antagonists, Beta-adrenoceptor blocking drugs, Calcium-channel blockers, centrally acting drugs, Diuretics, Vasodilators.

2.3 Consequences of non-adherence to antihypertensive medication

Hypertension is a serious public health issue in low and middle-income countries and affordability of medication is an important consideration as this is a problem for medication adherence. A recent systematic review of the literature on non-adherence to antihypertensive medication, among adults in low and middle-income countries, has highlighted that this is more problematic in some parts of the world. Affordability affects the treatment initiation and persistence components of adherence, as patients who cannot afford the medications typically do not buy them. Treatment escalation is one of the drivers for increased cost: poor adherence leads to treatment failure, disease progression and more complex treatments, which then lead on to further impact adherence. Adherence is perceived by payers to be associated with increased costs, and there is a need to raise awareness that reimbursement to avoid treatment escalation is beneficial. For example, supporting ambulatory blood pressure monitoring. Furthermore, most of the estimates of non-adherence are top down and are not sequential in terms of time. However, the key message remains that the number of patients who are non-adherent is high and this jeopardizes the healthcare budget. (Vrijens et al., 2017).

University of Ghana http://ugspace.ug.edu.gh

2.4 Adherence to Antihypertensive Treatment

The World Health Organization (WHO) evaluate the prevalence of non-adherence to antihypertensive medication to be among 30 to 50%. This disparity relates to the contrast in drug class, type of prevention and methods used to measure adherence (Naderi, Bestwick, & Wald, 2012).

A study in the US revealed a 30.5% non-adherence among adult hypertensive patients (Tong, Chu, Fang, Wall, & Ayala, 2016). A study in Hong Kong reported that about 55.9% of patients with hypertension indicated some degree of medication non-adherence (Lo, Chau, Woo, Thompson, & Choi, 2016). A study in Nigeria found that 23.9%, 36.8% and 39.5% had low, medium and high adherences respectively (Akintunde & Akintunde, 2015). A systematic review in developing countries showed that the mean prevalence of medication non-adherence (MNA) amid the selected hypertensive population was 47.34% (Dhar, Dantas, & Ali, 2017).

2.5 Ways of Assessing Adherence to antihypertensive

There are several ways of assessing if patients adhere to treatment or not. These methods are generally classified into two; direct and indirect. The direct method involves direct observation of the patient taking the medication, measuring of drug-related metabolic biomarkers and other biomarkers in blood (Gosmanova & Kovesdy, 2015). The indirect method which is mostly used in community research involves pill count, self-assessment and pharmacy records. Pill counting (checking up of patients' medication containers) has been universally used in adherence research due to the ease of organization and the perceived indifferences of this method (Ho, Bryson, & Rumsfeld, 2009). Another method used to assess adherence is the Medication

University of Ghana http://ugspace.ug.edu.gh

Electronic Monitoring System (MEMS). This electronic device is designed to register each drug canister opening and can therefore provide information on the number of times the patient has opened to take out medication from the container (Urquhart, 1997).

The analysis of pharmacy dispensing records is another method that can be used to assess adherence to medication and widely used in research (Ho et al., 2009). Patient self-report on adherence has also emerged as one of the methods used in studies. In this method, an individual is asked a series of questions and based on the response a weighted average score is computed and used to classify participants adherence status (Morisky, Green, & Levine, 1986). Adherence estimated from the use self-report questionnaire scale has been found to correspond with the outcome obtained by other methods (pill counts, pharmacy refills) and to correlate with BP control (Morisky, Ang, Krousel-Wood, & Ward, 2008).

2.6 Factors Affecting Adherence to Hypertensive Treatment

A strong focus is placed on understanding the variety of factors that may influence antihypertensive medication adherence. This is due to the reported high prevalence of hypertension complications related to improper antihypertensive medication adherence. The factors identified are allied to specific patient characteristics, health-related, medication-related, healthcare provider and health system factors. Various studies have attempted to determine the influence of a single factor such as smoking status or gender differences however, the issue of non-adherence is multifactorial. Thus, exploring multiple factors is essential to draw any clear conclusions. In order to stick to the objectives and purpose of the research, socio-demographic characteristics of patients and clinical or therapy related factors are highly highlighted with further explanations given below.

University of Ghana http://ugspace.ug.edu.gh

2.6.1 Socio-demographic Factors Affecting Adherence

Among Americans, a study found that non-adherence rates were highest among younger adults (aged 18–44 years), Hispanics, and those who reported lowest annual income < $25,000 (Tong et al., 2016). In another study, being employed, and very poor self-perceived health status were negatively accomplice with drug adherence (Lee et al., 2013). In Hong Kong, it was found that age, living alone, and approach related to treatment control were separately linked with increased disparity of medication adherence (Lo et al., 2016).

In Kinshasa, the possibility of non-adherence was also established to be higher among unemployed persons and people with low socioeconomic status (Lulebo et al., 2015). Hypertensive patients who had their own businesses were 72% less likely to adhere to medication matched with government employees in Ethiopia (Ambaw, Alemie, W/Yohannes, & Mengesha, 2012). Females were individually and accordingly associated with poor adherence in a study in India with hypertensive women 2.95 times more probably to be non-adherent to their medications than men (Kumar Praveen , 2010).

2.6.2 Clinical Factors Affecting Adherence to Antihypertensive treatment

In clinical practice, adherence could mean whether a patient takes medications as prescribed and persistence could mean whether a patient remains on therapy as long as needed. Measures as above, adherence to antihypertensive treatments were reported to be suboptimal ranging from 30% to 70% (Gwadry-Sridhar et al., 2013; Quine, Steadman, Thompson, & Rutter, 2012).

University of Ghana http://ugspace.ug.edu.gh

2.7 Conceptual Framework

Different models and theories have been developed and applied to identify factors affecting medication adherence. Selecting the appropriate model or theory is based on its components and their best fit to different units of practice. This aspect provides an overview on the theories used in medication adherence research, and intentional and unintentional medication non-adherence. This is followed by the conceptual framework that guided this study.

To gain a deeper knowledge about the factors associated with medication non-adherence, researchers have employed branches of cognitive theories. Some of the social cognition models used to investigate medication non-adherence have included the Health Belief Model (HBM), the Theory of Planned Behaviour (TPB) and the Social Learning Theory (SLT).

The Health Belief Model has been widely used in medication adherence studies. The underlying assumption of the model is that patients are able to make suitable decisions about their health. The model suggests that actions taken by patients are governed by a belief of susceptibility to having an ill-health condition; the presence of serious consequences due to the occurrence of the illness; the availability of courses of actions to avoid the condition; and an understanding that the advantages of taking the actions outweigh the costs. This model contains several cognitive constructs that predict why people take actions to control their illness. These constructs include perceived susceptibility, severity, threat, self-efficacy, benefits and barriers.

The main criticisms of the Health Belief Model include: the relationships between model constructs have not been investigated thoroughly; and that no definition has been built for the individual construct nor any clear rules of the relationship between these constructs were formulated. Another major weakness is that the Health Belief Model did not include the positive

University of Ghana http://ugspace.ug.edu.gh

effects of negative behaviour and social influences. A recently published meta-analysis signposted that the HBM model is able to predict 10% of variance in patient's behaviour at best. The studies included in the analysis were heterogeneous and were not able to support conclusions to validate the model. In terms of applying the model for studies concerning long-term medications adherence, it has been recommended that further studies to assess the validity of this model be undertaken.

The Theory of Planned Behaviour assumes that motives to perform certain behaviour involve the intention to perform the behaviour and the perceived behavioural control. The intention to perform a behaviour or not is determined by the person's attitude toward the behaviour. The individual's intention to perform certain behaviour is the best predictor and immediate determinant of that behaviour. This is based on whether the attitude reflects a positive or negative evaluation of the behaviour of interest. This is in addition to the subjective norm which includes the person's perception of the surrounding pressure from society or significant others, and by the perceived behavioural control which means perceiving that performing the behaviour of interest is within someone's control.

Despite this, the application of this model in medication adherence research has revealed variance in intention and behaviour. Not all of the components of this theory have operated as expected. Different studies have used various measurements to describe how each component of this model was operationalised, using different quantitative measures or structured qualitative interviews. It is argued that measurement items that were used in questionnaires to assess this model were not appropriately worded to assess each component, since they were designed to specifically answer the research questions under study. Therefore, it is challenging to describe the application of this model to medication adherence.

University of Ghana http://ugspace.ug.edu.gh

According to the results presented from a meta-analysis study examining this theory, the theory explains less than 50% of variance in intention and approximately 25% of variance in behaviour in intention alone. These results suggest that the support for this theory is limited. This is in addition to another major weakness of using this theory in medication adherence studies, since the theory omits the fact that patient's behaviours are not always under volitional control and it results because of the impacts of past behaviour on current behaviour such as the role of habit in adhering to medications.

The Social Learning Theory assists in understanding the driving forces of human behaviour. The main concept of the theory is that human functioning is directed by continuous interaction between the following three elements: behaviour, personal factors and the external environment. The regulation and motivation for personal behaviour is based on the individual's standards and on his or her evaluation of the reactions that the actions have been made. The important determinations of an individual's behaviour are personal factors, self-efficacy expectations and outcome expectations. Social Learning Theory is the best and most useful of the models of interventional studies conducted to improve medications adherence. This is when the intervention specifically targeted known obstacles of medication adherence, enhanced self-efficacy for patients regarding their medication adherence behaviour and problem-solving opportunities and strategies.

The previous theories serve interpersonal, environmental and social constructs of factors affecting medication non-adherence. However, the key limitations of adherence research within social cognition models are that there has been little consistency across studies and the proportion of variance in adherence behaviours predicted by social cognition models has generally been small. Additionally, it is argued that health behaviour does not arise from static

University of Ghana http://ugspace.ug.edu.gh

"one off" decisions, as implied by the social cognition model, but rather that decisions are made in stages. Moreover, the representations of these constructs differ across several illnesses and cultural groups.

Although different theories have attempted to identify factors associated with medication adherence, concepts of these theories miss important factors that are not involved in their scope, and which play a significant role in medication adherence, specifically antihypertensive medication adherence. Different studies that have been conducted in hypertension research have identified several variables associated with the issue of medication non-adherence. To demonstrate which factor is perceived as the most important cause of adherence, researchers have categorised these factors into dimensions. To investigate factors that account for patients' medication taking behaviour, the seminal research suggests two broad categories of medication non- adherence: intentional and unintentional. Accordingly, factors related to non-adherence fall into these categories. To understand the operation of the conceptual framework of this research project, it is valuable to provide an understanding of these two categories.

Intentional non-adherence occurs when the patient actively decides to deviate from the prescribed treatment plan. This involves a rational decision-making process, when the patient weighs the benefits of the prescribed medications against the uncertainty of the benefits of the medications. The concept of intentional medication non-adherence is best understood in terms of the belief factors that influence the start and continuation of the prescribed medications.

The applied theories in medication adherence studies have failed to uncover common major themes contributing to patients' belief about medication adherence in chronic illness, such as views about the general nature of medicines (healing and harm); negative views about

University of Ghana http://ugspace.ug.edu.gh

medications (addiction or overuse, long-term danger, medicine as poison); and doctors overuse of medicines. The great body of work that has combined these themes has concluded that concepts of belief related to chronic-illness medication are general belief concepts (harm and overuse), and specific beliefs (necessity and concern).

Useful themes to identify the general belief concept about medication involve the belief in the capacity of medicines to cause harm and in the overuse of medicines by doctors. The belief in medications as harmful emphasises that medicines are poisonous and addictive, and should not be used long-term. The overuse concept emphasises the perception that medicines are overused and overprescribed by physicians. Later works noted that these general perceptions about medicines arise from past experiences of the individual patient or others in addition to their beliefs about the nature of medications. Therefore, patients' beliefs about medicines in general should be differentiated from their beliefs about specific medications prescribed for a specific illness.

The specific concepts of belief about prescribed medicines involve the perception of the necessity of these medicines and the concern about using these specific medicines for one's illness. These concepts have been emphasised in the empirical literature that focussed on assessing the role of belief in medication adherence for a specific illnesses such as asthma. Understanding patients' specific beliefs about prescribed medications answers questions about how patients' beliefs about medications affect their adherence.

The unintentional dimension of non-adherence is defined as the passive behaviour of not adhering to medications and is not associated with individuals' beliefs or cognitive factors. Unintentional medication non- adherence is associated with patients' characteristics, in contrast

University of Ghana http://ugspace.ug.edu.gh

to their intentions, which are associated with the rational decision-making process (belief). Different factors have been researched in this area, including elements related to personal factors such as socio-demographics and knowledge; healthcare-system related factors such as comorbidities; or others that influence patients' adherence behaviour, such as the provider's communication and healthcare support.

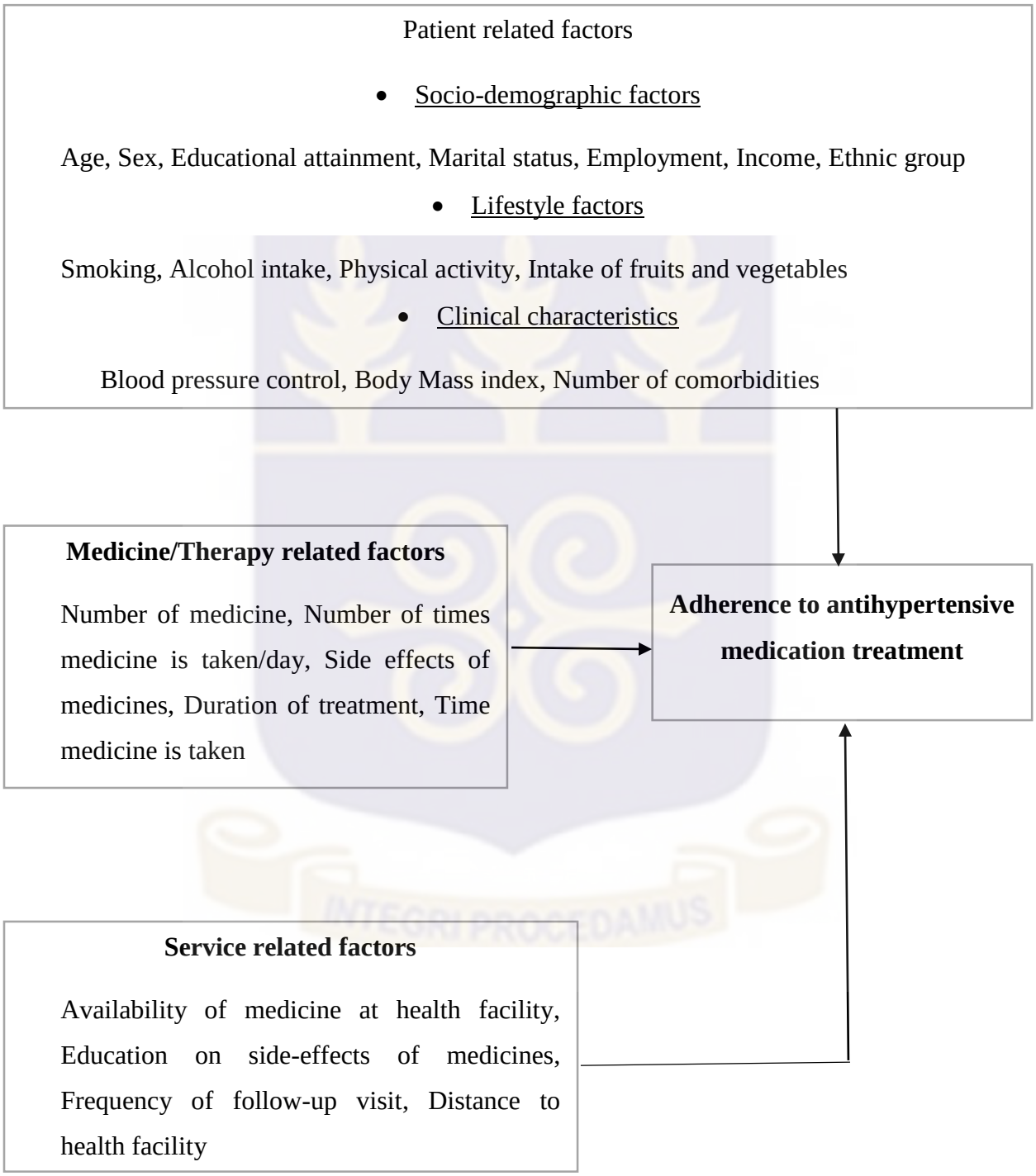
Although patients exhibit both intentional and unintentional facets of medication adherence, researchers are increasingly investigating a unilateral approach to medication adherence. Acknowledging both dimensions of medication adherence is encouraged by clinicians in order to understand the problem of non-adherence. The intentional and unintentional medication non-adherence categorization provided an understanding of classifying factors related to medication non-adherence under their categories. The World Health Organization Report of 2003 conceptualised factors related to medications adherence in the following domains: patient-related factors, socio-economic, health condition-related factors, therapy-related factors and healthcare system related factors.

The above review is based on the work of (F. J. A. Alsolami, 2016) from which the conceptual framework for this study has been adapted. For the purposes of simplicity and suitability to the objectives of this study, the five domains of the WHO conceptualised factors have been modelled into three main categories with socio-economic and health-related factors merging together under patient-related factors since they both have to do with personage of the patient.

University of Ghana http://ugspace.ug.edu.gh

Figure 2.1: Conceptual Framework for Factors Affecting Adherence to Antihypertensive.

Source: (F. J. A. Alsolami, 2016).



University of Ghana http://ugspace.ug.edu.gh

2.8 Barriers to Anti-hypertensive Adherence

An earlier study has found that overall patient contentment with healthcare, and medication barriers such as complex regimen and cost were factors that affected the adherence of patients to treatment. Type of antihypertensive has also been reported to be barriers that hinder treatment adherence. Barriers to drug adherence consist of many factors including complex medication regimens, dosing frequency, behavioral factors and side effects of treatment. In a study among hypertensive patients in Ghana, side effect emerged as one of the main reasons for non-adherence (Kretchy, Owusu-Daaku, & Danquah, 2014).

Duration of treatment has also been reported to affect adherence. It has been reported that, about 45% of newly diagnosed hypertensive patients stop to take their medication at one year after commencement of treatment (Mazzaglia et al., 2009). Pill burden is another factor that hinder adherence. It has been found in an earlier study that adherence rates are higher in patients that take a single drug therapy with minimal number of doses per day than those who take multiple treatment several times in day. Adherence is also associated with the use of certain types of antihypertensive than others. It was found that adherence was high among patients using renin–angiotensin system blockers and calcium channel blockers than those using diuretics and β-blockers (Benner et al., 2009).

Research suggest that low treatment satisfaction among patients with hypertension may be an important barrier for achieving high rates of antihypertensive medication adherence (Al-Jabi et al., 2015). This closely related to providing information to clients on the condition and the benefits of adhering to treatment. It was found that patients who were provided with information on their condition and perceived the treatment as beneficial were more likely to adhere than those who were unaware of the benefits of the treatment (Rajpura & Nayak, 2014). A poor

University of Ghana http://ugspace.ug.edu.gh

patient-provider relationship has also been reported as a factor inhibiting adherence in a systematic review of studies on adherence (van der Laan et al., 2017).

University of Ghana http://ugspace.ug.edu.gh

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology to be adopted for the research and it also covers the study area, the research design, population and sample size, source of data, the procedure for data collection and conclusion.

3.1 Study Design

This study adopted a descriptive cross-sectional research design and a quantitative research approach. A cross sectional survey is a type of observational study where data from a subset of a given population is selected and analyzed at a given point in time (Rindfleisch, Malter, Ganesan, & Moorman, 2008). The study used cross-sectional research design when analyzing data collected from hypertensive patients at a given point in time. Quantitative research approach was used when there was the need to create meaning through objective measurement of the situation and to present the findings of the study numerically: the quantitative research was used in collecting and converting data into numerical form so that the data could be analyzed.

3.2 Study Area

Maamobi General Hospital was established in 1969 as a polyclinic for the people of Ayawaso Central Sub Metro which is one of the six (6) Sub Metro Districts of the Accra Metropolitan Assembly (AMA), which in turn is one of the 26 Metropolitan/Municipal/District Assemblies of

University of Ghana http://ugspace.ug.edu.gh

the Greater Accra Region of the Republic of Ghana. The Ayawaso Sub Metro District occurs about 25 is bounded in the North by Ayawaso West Sub Metro, South by Osu Klottey Sub Metro, East by Ayawaso East Sub Metro and on the West side by Okaikoi South Sub Metro. The Sub Metro is the host of these communities; Maamobi, Kotobabi, New Town, Kokomlemle, Aladjo, Kpehe, Nima and Kanda as the major towns. The Metropolis for that matter the Sub-Metro as a cosmopolitan area, is home to men from almost all ethnic groups. Notable amongst them are Gas, Ewes, Hausas, Akans, Gonjas, and Dagombas. The 2010PHC estimated the population of the Sub-Metro as 142,322 with 68,390 houses and 73,932 households. Per the Greater Accra growth rate of 3.1%, it is estimated that the 2018 population of the Sub-Metro stands at 174,102. As a polyclinic, it actually became a general hospital in July 2011 and offers a 24-hour service. It happens to be the biggest health facility in the sub-metro. Their objectives, programmes and activities are drawn around the four thematic areas of the Ministry of Health notably; general health systems strength, health, reproduction and nutrition services, governance and financing, and healthy lifestyles and environment. The hospital can boast of some of these essential facilities and services; theatre, laboratory services, a full-fledged diabetes clinic, hypertension unit, eye and dental clinics, public health department, morgue, emergency unit, kitchen or catering services, and men, women, maternity and children's wards.

3.3 Sampling

3.3.1 Study Population

The study population includes outpatients attending the hypertensive clinic at Maamobi General Hospital. The study participants included both male and female patients attending the clinic who are 18 years and above as required for informed consent in Ghana (The Constitution of Ghana, 1992).

University of Ghana http://ugspace.ug.edu.gh

3.3.2 Sample Size Determination

The sample size for this study was computed using Cochran formula for population proportions in a cross sectional survey.

The formula for the sample size

$$N = \frac{Z^2 P(1-P)}{d^2}$$

Where N = the minimum sample size

Z is the standard normal variant for population distribution. In this study, a 95% confidence interval was used. Therefore, a 5% type 1 error was allowed and the level of significance placed at 5% giving Z = 1.96.

P = prevalence of adherence to antihypertensive medications. An earlier systematic review and meta-analysis found the adherence rate to antihypertensive treatment in low and middle income countries to be 57.5% (Bowry, Shrank, Lee, Stedman, & Choudhry, 2011). Hence, P is assumed to be to 0.575.

d = margin of error (0.05)

Hence,

$$N = \frac{1.96^2 * 0.575(1-0.575)}{0.05^2}$$

N = 375.5164

Therefore the sample size was 376.

However 10% non-response rate was added to increase the sample size to 413.

University of Ghana http://ugspace.ug.edu.gh

3.3.4 Sampling Method

In order to ensure that respondents are within the population sample, simple random sampling was used. Simple random sampling is a form of probability sampling. It is a sampling method where the participants in a study are selected by the researcher randomly. The simple random sampling method permits for the selection of participants whose qualities as well as experiences allow an understanding of the phenomena in question, and are therefore valuable. The simple random sampling was performed as follows;

before actual data collection, I accessed the OPD's register after seeking permission from the In-charge through the hospital's administrator. This enabled me to extract contact information on hypertensive patients which was used as a means of getting to the respondents and get the questionnaires completed. I also identified a staff in the hypertensive unit of the Maamobi General hospital who acted as a collaborator to contact the selected participants before they were administered questionnaires. This helped to reduce unresponsive rate since the collaborator had complied a list of all patients on antihypertensive treatment who met the inclusion criteria and had been approved to be contacted for their participation in the study. The list of patients was categorized by sex (male and female),

based on the contribution of each of the sex to the sampling frame, a proportional allocation of the number of male and female participants was determined. Each participant was given a unique identification number. Microsoft (MS) excel random numbers generator was used to randomly select the 413 participants for this study. Individuals whose numbers had been generated from excel were contacted for questionnaire administration either at home or during their next visit to the clinic.

University of Ghana http://ugspace.ug.edu.gh

3.4 Variables in the Study

The Variables for this study are summarized in Table 3.1.

Table 3.1: Variables in this Study

Variable	Definition	Level of measurement
Dependent Variable		
Adherence	Self-reporting of never missing a medication	Adherence, non-adherence
Independent Variables		
Age	Completed years	Continuous
Sex	Biological	Male, female
Educational attainment	Highest education attained	No Formal education, Primary, Secondary, Tertiary
Income	Monthly income received from all sources	Amount in Ghana Cedis
Side effects of medication	Ever reporting of having experienced an unpleasant situation after medication	Have experienced side effect, never experienced side effect
Social support	Receiving treatment support from family member	Has social support, no social support
Availability of medication	Ever visited health facility and was not given medicine because it was out of stock	Regular supply, irregular supply
Smoking	Whether the person has ever/currently takes tobacco	Current smoker, past smoker non-smoker
Alcohol consumption	Whether person has ever/currently taking alcohol irrespective of quantity	Current alcohol intake, past alcohol intake, never taken alcohol

University of Ghana http://ugspace.ug.edu.gh

3.5 Inclusion and Exclusion Criteria

To qualify as a participant in this study, the patient must be on the anti-hypertensive treatment for at least three months. Patients who met the inclusion criteria but are critically ill at the time of data collection were excluded from the study.

3.6 Source of Data and Data Collection

The study used primary data collected from outpatients on the anti-hypertensive treatment for at least three months at Maamobi General Hospital in the Greater Accra Region through the administration of questionnaires. The study gathered primary data through pilot testing of instruments, and administering of questionnaires. These are further discussed in the sub-sections below.

3.6.1 Pilot-Testing of Instruments

According to (Lee et al., 2017), pilot testing means finding whether the research, or questionnaire administered would work by first administering it to a few participants. This enabled the researcher to evaluate the antihypertensive patients' behavior with regards to comfort when answering the questionnaire and the exact time they spend answering it. Based on this, a sample of 30 anti-hypertensive patients at Taifa Polyclinic who did not partake in the research were carefully chosen for the pilot testing of the questionnaires. The goal of conducting a pilot testing survey was to evaluate the reliability of the questionnaires planned to be administered to the antihypertensive patients sampled.

University of Ghana http://ugspace.ug.edu.gh

3.6.2 Questionnaire

The study used structured questionnaire for data collection. The first part of the structured questionnaire was based on socio-demographic characteristics of the participants. These included sex, age, highest education attained, marital status, and income level. These variables have been reported in literature to affect adherence to anti-hypertensive medications. The second section of the questionnaire was based on clinical related factors. The final section of the questionnaire was based on the adoption of Morisky-Green Test (MGT) scale which was used to assess the degree of adherence to antihypertensive treatment. This scale was based on patients' self-report answers to an eight item scale (Morisky et al., 1986).

3.7 Data Analysis

The primary data collected was coded and entered into a Microsoft Excel 2010 spreadsheet and STATA version 15. Percentages, frequency tables, pie chart, and cross tabulations were the statistical tools used for describing the data while Multiple Logistic Regression and Chi-Squared test were used to analyze the data. The main reason for using these statistical tools were to present clear understanding of information to the reader. Cross tabulation is a tool used to describe the association between two categorical variables while the Chi-Squared test is used to test the association between the two categorical variables. The cross tabulation was used to find the relationship between socio-demographics of hypertensive patients and adherence to anti-hypertensive treatment as well as find the association between clinical characteristics and adherence to anti-hypertensive treatment. The Chi-Squared test was used to test the cross tabulations. The significant variables from the Chi-Squared test were moved into Multiple Logistic Regression model for analysis. Variables which were less than 5% significance level were deemed as significant.

University of Ghana http://ugspace.ug.edu.gh

3.8 Ethical considerations

3.8.1 Ethical approval

The protocol for this study was submitted to the ethics review committee of the Ghana Health Service for approval. The study was conducted only after approval from this institution, which is mandated to undertake ethical review of research involving healthcare facilities in Ghana.

3.8.2 Institutional Approval

Introductory letter was sent to the Maamobi General Hospital for the study to seek for their approval before the commencement of the study. This was done after the protocol received approval from the Ghana Health Service Ethics Committee.

3.8.3 Informed Consent

All potential participants received information about the study in their language of choice, which enhanced free and easy understanding of technical jargon. Participants were given sufficient time to reflect on the information and questions asked. Those who consented to participate in the study were requested to sign an informed consent form before participating in the study. For participants who could not read, the information was read to them in a language they understood after which they were required to thumbprint as an indication of acceptance to participant in the study.

3.8.4 Confidentiality and Privacy

All participants were assured of their privacy and that their identities would not be disclosed in disseminating findings of this study.

University of Ghana http://ugspace.ug.edu.gh

3.8.5 Right of withdrawal

It was made clear to participants in the survey that they are free to withdraw from the study at any stage without risk of any negative consequences to them.

3.8.6 Risks and Benefits

There was no risk involved in participating in this study. Participants did not have direct benefit in this study but the findings may be used to develop policies which may in future inure to the benefit of adherence to treatment.

3.8.7 Provision of Contact Details

The contact details of the people associated with this study including the telephone numbers of Principal Investigator, Supervisor and the administrator of Ethics Review Committee of the Ghana Health Service were made available to participants/respondents should they had required further information and assistance.

3.8.8 Data Storage and Usage

The data collected was used for research purposes and people who were not involved in this study did not have access to the data. Findings of the study were shared with stakeholders. However, the identities of the participants were not disclosed on such dissemination platforms.

3.8.9 Conflict of Interest

There was no conflict of interest associated with this study.

3.8.10 Funding

This study was solely funded by me (the researcher/principal investigator).

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the findings and results of the study. This study used primary data collected from the Maamobi General Hospital in the Greater Accra Region to assess the adherence to anti-hypertensive medication among adults attending out-patients' clinic from 9th June to 26th June, 2018. Descriptive Statistics such as pie chart, frequency tables and cross tabulations were employed to explain the data graphically while statistical tools such as Chi-Squared Test and Multiple Logistic Regression were used for analysing the data collected.

4.1 Socio-Demographics Characteristics of Hypertensive Patients

A total of 413 hypertensive patients fulfilled inclusive criteria and were invited for interview and 317 had completed the questionnaire making a response rate of 76%. Table 4.1 shows the Socio-demographic characteristics of participants. From Table 4.1, participants consisted of 227 (71.61%) females. The mean age of participants was 57.90 (± 14.08) years, with the minimum of 26 and maximum of 89 years. About 4.48% (n = 141) of the participants were elders (65 years and older).

Majority of the participants 201 (63.41%) were Christians and 109 (34.38%) were married. Out of the total participants, 75 (23.66%) participants had either not been to school before or had attained primary educational level and 114 (45.43%) participants were sole proprietors of their private businesses. About 128 (40.38%) participants belonged to the Akan ethnic group, and 260 (82.02%) participants had medium wealth (between Ghc300 and Ghc3000).

University of Ghana http://ugspace.ug.edu.gh

Table 4.1: Socio-demographic Characteristics of Hypertensive Patients at the Mamobi General hospital in the Greater Accra Region from 9th May, 2018 to 6th June, 2018 (n=317).

Characteristics	Frequency	Percentage (%)
Gender		
Female	227	71.61
Male	90	28.39
Marital Status		
Single	97	30.60
Married	109	34.38
Divorced	69	21.77
Widow/Widower	22	6.94
Separated	20	6.31
Age Mean (± SD) 57.90 (± 14.08)		
≤30 years	19	5.99
31-40 years	25	7.89
41-50 years	42	13.25
51-60 Ears	90	28.39
>60 years	141	44.48
Educational Status		
None	75	23.66
Primary School	75	23.66
Junior High School	40	12.62
Middle School	33	10.41
Senior High School	22	6.94
Certificate/Diploma	26	8.20
Tertiary	46	14.51
Work Status		
Unemployed	22	6.94
Private Business (Sole Proprietorship)	144	45.43
Private Business (Joint Venture)	45	14.20

University of Ghana http://ugspace.ug.edu.gh

Government Work	89	28.08
Retired	17	5.36
Ethnic Group		
Akan	128	40.38
Ewe	43	13.56
Ga	76	23.97
Mamprusi/Dagomba	47	14.83
Others	23	7.26
Religion		
Christianity	201	63.41
Muslim	53	16.72
Traditional	39	12.30
Others	24	7.57
Monthly Wealth Status		
Poor (<300)	26	8.20
Medium (Ghc300- Ghc3000)	260	82.02
Rich (>Ghc 3000)	31	9.78

4.2 Clinical Characteristics of Hypertensive Patients at the Maamobi General Hospital

As shown in Table 4.2, more than half of the participants 173 (54.57%) were either overweight or obese and only 144 participants (45.43%) had normal body mass. Also, 55% of the participants (n = 168) had their BP controlled with 210 (70.23%) adhering to anti-hypertensive medication. Concerning duration of hypertension, 126 (57.9%) participants had the condition for one to three years and, more than half (n = 175, 55.20%) of the participants had at least two written evidence of co-morbidity. Furthermore, 173 (61.8%) of the participants were adherent to their antihypertensive medication.

University of Ghana http://ugspace.ug.edu.gh

Table 4.2: Clinical Characteristics of Hypertensive Patients

Characteristics	Frequency	Percentage (%)
Body Mass Index (BMI)		
Normal	144	45.43
Overweight	68	21.45
Obese	105	33.12
Number of Co-Morbidities		
None	83	26.18
One	59	18.61
Two	110	34.70
Three	48	15.14
≥Four	17	5.36
Blood Pressure		
Uncontrolled	149	47.00
Controlled	168	53.00
Taking Medications for Hypertension		
Yes	221	69.72
No	96	30.28
Duration of taking Anti-hypertension Medications		
<1 year	57	17.98
1-3 years	126	39.75
3-6 years	98	30.91
>6 years	36	11.36
Number of Anti-hypertension drugs		
Mono-therapy	69	21.77
Two drugs	148	46.69
Three or above drugs	100	31.55
Number of tablets per day		
One	79	24.92
Two	176	55.52

University of Ghana http://ugspace.ug.edu.gh

4.3 Drug taking behaviour within last six months according to MMAS-8 items score

Table 4.3 illustrates the responses to MMAS-8 items. Approximately 75.08% of patients forgot to take medicines and 68.45% missed to take drugs within 2 weeks. Nearly 32.18% of patients refused to stop the medicine, but 64.98% had halted medication themselves when they felt that their condition improved. Almost 70.03% of patients forgot to take medicine along when travelling or when they left home. Interestingly, 58.99% feel pressurized about sticking to treatment plan and 47.63% had difficulty in remembering to take all medicine.

Table 4.3: Drug taking behaviour within last six months according to MMAS-8 items score

	No N (%)	Yes N (%)
Forget to take medicine	79(24.92)	238(75.08)
Miss to take medicine within last 2 weeks	100(31.55)	217(68.45)
Cut back or stop medicine without telling the doctor	102(32.18)	215(67.82)
Forget to bring medicine when traveling or leave home	95(29.97)	222(70.03)
Take medicine yesterday	240(75.71)	77(24.29)
Stop taking medicine when feel symptoms are under control	111(35.02)	206(64.98)
Feel hassled about sticking to treatment plan	130(41.01)	187(58.99)
	More than once	Never
Difficulty in remembering to take all medicine	166(52.37)	151(47.63)

University of Ghana http://ugspace.ug.edu.gh

4.4 Adherence to anti-hypertensive treatment

The patients' adherence to anti-hypertensive treatment is shown in Figure 4.1. Out of 317 patients who received anti-hypertensive treatment, 217 (68.45%) of patients (score ≥ 6 out of 8) indicating that they had good adherence to anti-hypertensive treatment while 100 (31.55%) had poor adherence to anti-hypertensive treatment (score < 6).

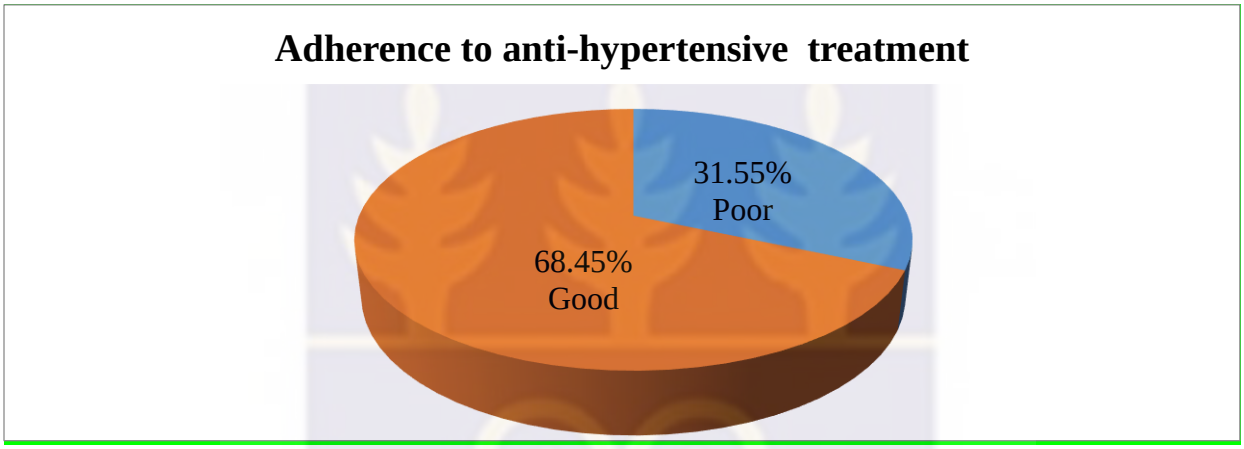


Figure 4.1: Adherence to anti-hypertensive treatment

4.5 Association between Socio-Demographic Characteristics and Adherence to anti-hypertensive treatment

Table 4.4 shows the association between socio-demographic characteristics and adherence to anti-hypertensive treatment. The gender of patients who adhered to anti-hypertensive treatment were compared and the female patients had poor adherence (76.5%) as compared to males (23.5%), which was statistically significant ($\chi 2$ = 8.087, P-value =0.004). Also, the age of patients were identified to have an association with adherence to anti-hypertensive treatment ($\chi 2$ = 10.186, P-value = 0.037). Married people had poor adherence to anti-hypertensive treatment. There was an association between marital status and adherence to treatment ($\chi 2$ = 19.844, P-

University of Ghana http://ugspace.ug.edu.gh

value = 0.001). Furthermore, the work status of patients was also identified to have an association with adherence to anti-hypertensive treatment ($\chi 2$ = 27.630, P-value = 0.000). Sole proprietorship had poor adherence to anti-hypertensive treatment.

The findings showed that educational ($\chi 2$ = 6.501, P-value = 0.369) and religious status ($\chi 2$ = 0.330, P-value = 0.954) were not associated with the adherence to anti-hypertensive treatment by patients. Comparing wealth status with patients who adhered to anti-hypertensive treatment, patients who had poor adherence (85.3%) were more likely to be poorer than patients who had good adherence (75.0%), which was statistically significant ($\chi 2$ = 5.525, P-value = 0.003). Smoking and Alcoholic status were not significantly associated with adherence to anti-hypertensive treatment.

University of Ghana http://ugspace.ug.edu.gh

Table 4.4: Association between Socio-Demographic Characteristics and Adherence to Anti-Hypertensive Treatment

	Adherence to Anti-Hypertensive Treatment				
Characteristics	**Good**	**Poor**	**Total**		
	N (%)	**N (%)**	**N (%)**	**ChiSquared**	**P-Value**
Gender					
Male	39(39.0)	51(23.5)	90(28.4)	8.087	0.004**
Female	61(61.0)	166(76.5)	227(71.6)		
Marital Status					
Single	26(26.0)	71(32.7)	97(30.6)		
Married	34(34.0)	75(34.6)	109(34.4)		
Divorced	15(15.0)	54(24.9)	69(21.8)	19.844	0.001**
Widow/Widower	12(12.0)	10(4.6)	22(6.9)		
Separated	13(13.0)	7(3.2)	20(6.3)		
Age					
20-30 years	11(11.0)	8(3.7)	19(6.0)		
31-40 years	7(7.0)	18(8.3)	25(7.9)		
41-50 years	17(17.0)	25(11.5)	42(13.2)	10.186	0.037**
51-60 years	29(29.0)	61(28.1)	90(28.4)		
≥ 60 years	36(36.0)	105(48.4)	141(44.5)		
Educational Status					
None	29(29.0)	46(21.2)	75(23.7)		
Primary School	28(28.0)	47(21.7)	75(23.7)		
Junior High School	8(8.0)	32(14.7)	40(12.6)		
Middle School	9(9.0)	24(11.1)	33(10.4)	6.501	0.369
Senior High School	5(5.0)	16(7.4)	22(6.9)		
Certificate/Diploma	8(2.5)	18(8.3)	26(8.2)		
Tertiary	12(3.8)	34(15.7)	46(14.5)		

University of Ghana http://ugspace.ug.edu.gh

Work Status					
Unemployed	15(15.0)	7(3.2)	22(6.9)		
Private(Sole Proprietorship)	40(40.0)	104(47.9)	144(45.4)		
Private business (Joint Venture)	15(15.0)	30(13.8)	45(14.2)	27.630	0.000**
Government Work	19(19.0)	70(32.3)	89(28.1)		
Retired	11(11.0)	6(2.8)	17(5.4)		
Ethnic Group					
Akan	33(33.0)	95(43.8)	128(40.4)		
Ewe	16(16.0)	27(12.4)	43(13.6)		
Ga	23(23.0)	53(24.4)	76(24.0)	10.273	0.036**
Mamprusi/Dagomba	23(23.0)	24(11.1)	47(14.8)		
Others	5(5.0)	18(8.3)	23(7.3)		
Religion					
Christianity	65 (65.0)	136(62.7)	201(63.4)		
Muslim	17(17.0)	36(16.6)	53(16.7)	0.330	0.954
Traditional	11(11.0)	28(12.9)	39(12.3)		
Others	7(7.0)	17(7.8)	24(7.6)		
Wealth Status					
Poor (<Ghc300)	75(75.0)	185(85.3)	260(82.0)		
Medium (Ghc300-3000)	10(10.0)	16(7.4)	26(8.2)	5.525	0.003**
Rich (>Ghc3000)	15(15.0)	16(7.4)	31(9.8)		

** is significant at 5% level of significance.

University of Ghana http://ugspace.ug.edu.gh

4.6 Association between Clinical Characteristics and Adherence to Anti-Hypertensive Treatment

Table 4.5 shows that there was no association between body mass index of patients and their adherence to anti-hypertensive treatment ($\chi 2$ = 2.602, P-value = 0.272). However, more of the patients who were obese (31.8%) or overweight (44.2%) reported poor adherence to anti-hypertensive treatment compared to patients with normal body mass index. Also, co-morbidity was identified to be accomplice with patients' adherence to anti-hypertensive treatment ($\chi 2$ = 1.968, P-value = 0.0142) even though patients with two co-morbidities were identified to have poor adherence to anti-hypertensive treatment. When related with patients (70) who had good adherence to anti-hypertensive treatment, patients (98) who had poor adherence were more likely to have blood pressure uncontrolled even though blood pressure was identified to be associated with patients' adherence to anti-hypertensive treatment ($\chi 2$ = 16.954, P-value = 0.000).

Furthermore, comparing with patients (38) who had good adherence to anti-hypertensive treatment, the patients who had poor adherence were more likely to have longer duration of taking hypertension treatment within 1-3 year and on two different anti-hypertensive drugs each day which were not statistically significant ($\chi 2$ = 0.639, P-value = 0.0134).

University of Ghana http://ugspace.ug.edu.gh

Table 4.5: Association between Clinical Characteristics and Adherence to Antihypertensive treatment

Adherence to Anti-Hypertensive Treatment					
Characteristics	**Good N (%)**	**Poor N**	**Total N (%)**	**Chi-Squared**	**P-Value**
Body Mass Index(BMI)					
Overweight	48(48.0)	96(44.2)	144(45.4)		
Normal	16(16.0)	52(24.0)	68(21.5)	2.602	0.272
Obese	36(36.0)	69(31.8)	105(33.1)		
Number of Co-Morbidities					
None	27(27.0)	56(25.8)	83(26.2)		
One	17(17.0)	42(19.4)	59(18.6)		
Two	39(39.0)	71(32.7)	110(34.7)	1.968	0.014**
Three	13(13.0)	35(16.1)	48(15.1)		
≥Four	4(4.0)	13(6.0)	17(5.4)		
Blood Pressure					
Uncontrolled	70(70.0)	98(45.2)	168(53.0)	16.954	0.000**
Controlled	30(30.0)	119(54.8)	149(47.0)		
Taking Medications for Anti-Hypertension					
Yes	38(38.0)	58(26.7)	96(30.3)	4.120	0.030**
No	62(62.0)	159(73.3)	221(69.7)		
Duration of taking Anti-hypertension Medications					
<1 year	19(19.0)	38(17.5)	57(18.0)		
1-3 years	38(38.0)	88(40.6)	126(39.7)	0.639	0.0134**
3-6 years	33(33.0)	65(30.00	98(30.9)		
>6 years	10(10.0)	26(12.0)	36(11.4)		
Number of Anti-hypertension drugs					
Mono-therapy	26(26.0)	43(19.8)	69(21.8)		
Two drugs	41(41.0)	107(49.3)	148(46.7)	2.313	0.315
Three or above drugs	33(33.0)	67(30.9)	100(31.5)		
Number of tablets per day					
One	18(18.0)	61(28.1)	79(24.9)		
Two	64(64.0)	112(51.6)	176(55.5)	4.881	0.087

** is significant at 5% level of significance.

University of Ghana http://ugspace.ug.edu.gh

4.7 Multiple Logistic Regression Analysis of the influence of Socio-demographic characteristics on anti-hypertensive treatment adherence in patients

Table 4.6 shows the multiple logistic regression analysis of the influence of socio-demographic characteristics on anti-hypertensive treatment adherence of patients. The Chi-squared value is 77.10 with a P-value of 0.000. This shows the overall significance of the logistic regression model that was used to explain the socio-demographic variables that influence patients' adherence to antihypertensive treatment. Hence the Multiple Logistic Regression model is appropriate. From Table 4.6, the multivariate analysis shows that gender, age, work status, marital status, and wealth status were significantly associated with adherence to antihypertensive treatment. Consequently, female patients in the study were 0.522 times (AOR = 0.522, 95% CI = 0.269, 1.013, P = 0.045) more likely to adhere to antihypertensive medications than male patients. Besides, the odds of good adherence to antihypertensive medication was 8.280 (AOR = 8.289, 95% CI = 2.576, 26.62, P-value = 0.000) higher among married patients compared to their counterparts.

Participants who were above 60 years were 0.161 times (AOR = 0.161, 95% CI = 0.513, 0.504, P-value = 0.002) more likely to adhere to antihypertensive medications compared to those who were 60 years and below. Furthermore, the odds of adherence of patients who worked in government institutions was 0.143 times (AOR = 0.143, 95% CI = 0.043, 0.478) higher compared to their counterparts. Rich patients were 3.352 (AOR = 3.352, 95% CI = 1.303, 8.624, p = 0.012) more likely to be adherent compared to patients who were poor.

University of Ghana http://ugspace.ug.edu.gh

Table 4.6: Multiple Logistic Regression Analysis of the influence of socio-demographic characteristics on anti-hypertensive treatment adherence in patients

	Crude Odds Ratio			Adjusted Odds Ratio		
	OR	P-Value	95% CI	OR	P-Value	95% CI
Gender						
Male	1			1		
Female	0.367	0.000**	0.274, 0.493	0.522	0.045**	0.269, 1.013
Marital Status						
Single	1			1		
Married	0.453	0.000**	0.302, 0.680	8.289	0.000**	2.576, 26.62
Separated	0.278	0.000**	0.157, 0.492	0.639	0.296	0.276, 1.479
Widow/Widower	1.2	0.670	0.518, 2.777	2.977	0.052**	0.992, 8.935
Divorced	1.857	0.187	0.741, 4.655	1.272	0.210	0.628, 2.577
Age						
≤ 30 years	1			1		
31-40 years	0.283	0.050	0.080, 0.999	0.659	0.021**	0.137, 0.318
41-50 years	0.495	0.209	0.165, 1.485	0.217	0.025**	0.568, 0.827
51-60 years	0.346	0.040**	0.126, 0.952	0.225	0.016**	0.672, 0.757
> 60 years	0.249	0.006**	0.093, 0.669	0.161	0.002**	0.513, 0.504
Educational Status						
None	1			1		
Primary School	0.596	0.030**	0.373, 0.951	0.869	0.727	0.394, 1.916
Junior High School	0.25	0.000**	0.115, 0.543	0.459	0.143	0.162, 1.302
Middle School	0.375	0.012**	0.174, 0.807	0.421	0.111	0.146, 1.219
Senior High School	0.375	0.040**	0.147, 0.958	0.531	0.336	0.146, 1.928
Certificate/Diploma	0.444	0.056	0.193, 1.022	0.639	0.442	0.205, 1.999
Tertiary	0.353	0.002**	0.183, 0.682	0.444	0.110	0.164, 1.202
Work Status						
Unemployed	1			1		
Sole Proprietorship	0.385	0.000**	0.267, 0.554	0.181	0.012**	0.061, 0.538

University of Ghana http://ugspace.ug.edu.gh

Joint Venture	0.5	0.028**	0.269, 0.929	0.278	0.045**	0.079, 0.974
Government Work	0.271	0.000**	0.163, 0.451	0.143	0.001**	0.043, 0.478
Retired	1.833	0.232	0.678, 4.957	0.442	0.291	0.098, 2.008
Ethnic Group						
Akan	1			1		
Ewe	0.593	0.097	0.319, 1.100	1.641	0.270	0.681, 3.956
Ga	0.434	0.001**	0.266, 0.708	1.256	0.555	0.589, 2.677
Mamprusi/Dagomba	0.958	0.884	0.541, 1.698	2.246	0.071	0.934, 5.399
Others	0.278	0.011**	0.103, 0.748	0.770	0.688	0.215, 2.760
Religion						
Christianity	1			1		
Muslim	0.472	0.011**	0.265, 0.841	1.080	0.851	0.485, 2.405
Traditional	0.393	0.009**	0.196, 0.789	0.566	0.209	0.233, 1.376
Others	0.412	0.048**	0.171, 0.993	1.053	0.927	0.350, 3.164
Monthly Wealth Status						
Poor (< Ghc300)	1			1		
Medium (Ghc300-3000)	0.625	0.244	0.284, 1.377	1.953	0.190	0.718, 5.312
Rich (>3000)	0.938	0.857	0.464, 1.896	3.352	0.012**	1.303, 8.624

** is significant at 5% level of significance

4.8 Multiple Logistic Regression Analysis of the influence of clinical characteristics on anti-hypertensive treatment adherence in patients

Table 4.7 shows the multiple logistic regression analysis of the influence of clinical characteristics on anti-hypertensive treatment adherence of patients. The Chi-squared value is 57.62 with a P-value of 0.000. This shows the overall significance of the logistic regression model that was used to explain the clinical characteristics variables that influence patients'

University of Ghana http://ugspace.ug.edu.gh

adherence to antihypertensive treatment. Hence the Multiple Logistic Regression model is appropriate.

From Table 4.7, the multivariate analysis shows that having co-morbidity, duration of taking anti-hypertensive treatment, having controlled blood pressure were significantly associated with adherence to antihypertensive treatment. Consequently, patients in the study who had one co-morbidity were 1.133 times (AOR = 1.133, 95% CI = 0.524, 2.451, P = 0.0151) more likely to adhere to antihypertensive medications than their counterparts. Besides, the odds of good adherence to antihypertensive medication was 4.342 times (AOR = 4.342, 95% CI = 4.205, 4.570, P-value = 0.000) higher among respondents with blood pressure controlled compared to patients with uncontrolled blood pressure. Participants who were on antihypertensive medications for six or more years were 1.09 times (AOR = 1.09, 95% CI = 0.568, 2.086, P-value = 0.097) more likely to adhere to antihypertensive medications compared to those who were on antihypertensive medications for less than six years.

Furthermore, the odds of adherence to antihypertensive medications was 1.54 times (AOR = 1.54, 95% CI = 0.370, 1.6566) higher in participants who are obese as compared to those with normal body mass index. Those taking alcohol (AOR =1.74, 95% CI = 0.735, 2.092, P < = 0.042) were 1.74 times more likely to be adherent compared to patient who were not taking alcohol. Also, smokers (AOR = 0.460, 95% CI = 0.137, 1.544, P-value = 0.0209) were 54 times more likely to be non-adherent to antihypertensive treatment compared to patients who did not smoke.

University of Ghana http://ugspace.ug.edu.gh

Table 4.7: Multiple Logistic Regression Analysis of the influence of clinical characteristics on anti-hypertensive treatment adherence in patients

	Crude Odds Ratio			Adjusted Odds Ratio		
	OR	P-Value	95% CI	OR	P-Value	95% CI
Smoking Status						
No Smoking	1			1		
Smoking	3.500	0.027**	1.152, 10.63	0.460	0.021**	0.137, 1.544
Alcohol Drinking Status						
Take Non-Alcoholic Drink	1			1		
Take Alcoholic Drink	1.151	0.001**	1.393, 3.408	1.740	0.042**	0.735, 2.092
Body Mass Index(BMI)						
Normal	1			1		
Overweight	3.571	0.000**	1.975, 6.460	1.54	0.038**	0.370, 1.656
Obese	2.029	0.001**	1.346, 3.060	1.315	0.345	0.745, 2.320
Number of Co-Morbidities						
None	1			1		
One	3.333	0.000**	1.749, 6.354	1.133	0.015**	0.524, 2.451
Two	1.816	0.003**	1.222, 2.698	1.322	0.366	0.722, 2.417
Three	3.182	0.001**	1.616, 6.265	0.836	0.658	0.378, 1.849
≥Four	3.250	0.039**	1.060, 9.967	0.848	0.799	0.238, 3.024
Blood Pressure						
Controlled	1			1		
Uncontrolled	4.385	0.000**	2.864, 6.713	4.342	0.000**	4.205, 4.570
Taking Medications for Hypertension						
Yes	1			1		
No	2.833	0.000**	2.078, 3.864	0.549	0.023**	0.328,0.919
Duration of taking Anti-hypertension Medications						
<1 year	1			1		
1-3 years	2.576	0.000**	1.723, 3.850	1.320	0.019**	0.502, 1.685
3-6 years	2.207	0.000**	1.423, 3.422	1.09	0.799	0.568, 2.086
>6 years	2.500	0.014**	1.201, 5.205	1.00	0.97	0.404, 2.486
Number of Anti-hypertension drugs						
Mono-therapy	1			1		
Two drugs	2.784	0.000**	1.912, 4.053	0.801	0.457	0.445, 1.439
Three or above drugs	2.031	0.001**	1.330, 3.102	1.023	0.946	0.535, 1.954

** is significant at 5% level of significance

University of Ghana http://ugspace.ug.edu.gh

4.9 Barriers of Adherence to Anti-hypertensive treatment

Table 4.8 shows the main barriers facing patients' adherence to anti-hypertensive treatment. From Table 4.8, Out of 115 (36.28%) patients who declared that side effect was the main barrier to antihypertensive treatment, 96 (83.48%) patients declared that side effect of treatment was the main barrier hindering a patient's adherence to anti-hypertensive treatment. Out of 20 (6.31%) patients who declared that dosing frequency was the main barrier to anti-hypertensive treatment, 11 (69.09%) patients declared that dosing frequency was the main barrier hindering a patient's adherence to anti-hypertensive treatment. Out of 27 (8.52%) patients who declared that complex medication regimens was the main barrier to anti-hypertensive treatment, 14 (51.85%) patients declared that complex medication regimens was the main barrier hindering a patient's adherence to anti-hypertensive treatment.

Furthermore, Out of 76 (23.97%) patients who declared that low treatment satisfaction was the main barrier to anti-hypertensive treatment, 53 (69.74%) patients declared that low treatment satisfaction was the main barrier hindering a patients' adherence to anti-hypertensive treatment. Out of 19 (5.99%) patients who declared that pill burden was the main barrier to anti-hypertensive treatment, 11 (57.89%) patients declared that pill burden was the main barrier hindering a patient's adherence to anti-hypertensive treatment. Out of 25 (7.89%) patients who declared that, type of treatment such as diuretics and β-blockers were the main barriers to anti-hypertensive treatment, 16 (64.0%) patients declared that, type of treatment such as diuretics and β-blockers were the main barriers hindering a patient's adherence to anti-hypertensive treatment. Out of 18 (5.68%) patients who declared that longer duration of treatment was the main barrier to anti-hypertensive treatment, 10 (55.56%) patients declared that longer duration of treatment was the main barrier hindering a patient's adherence to anti-hypertensive treatment. Finally, out

University of Ghana http://ugspace.ug.edu.gh

of 17 (5.36%) patients who declared that cost of treatment was the main barrier to anti-hypertensive treatment, 10 (58.82%) patients declared that cost of treatment was the main barrier hindering a patient's adherence to anti-hypertensive treatment.

Table 4.8 shows that barriers to hypertensive treatment have an association with patients' adherence to anti-hypertensive treatment ($\chi 2$ = 4.58, P-value = 0.0044) with side effects of treatment being the main barrier hindering adherence to anti-hypertensive treatment in Ghana. This is consistent with the findings of (I. Kretchy, Owusu-Daaku, & Danquah, 2013).

Table 4.8: Main Barriers Hindering Patients' Adherence to Hypertensive Treatment

	Adherence to Treatment				
	Yes	No	Total		
Main Barriers	N (%)	N (%)	N (%)	Value	P-value
Side effects of treatment	96(83.48)	19(16.52)	115(36.28)		
Dosing frequency	11(69.09)	9(30.91)	20 (6.31)		
Complex medication regimens	14(51.85)	13(48.15)	27(8.52)		
Low treatment satisfaction	53(69.74)	23(30.26)	76(23.97)		
Pill burden	11(57.89)	8(42.11)	19(5.99)	4.58	0.0044**
Types of treatment such as diuretics and β-blockers	16(64.0)	9(36.0)	25(7.89)		
Longer duration of treatment	10(55.56)	8(44.44)	18(5.68)		
Cost of treatment	10(58.82)	7(41.18)	17(5.36)		
Total	221(69.72)	96(30.28)	317(100)		

** is significant at 5% level of significance

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction

This chapter discusses into detail the socio-demographic and clinical characteristics associated with a patient's adherence to anti-hypertensive treatment. The study identified that 50% of out-patients' clinic hypertensive patients in Maamobi General Hospital could be described as good adherents to anti-hypertensive treatment. The adherence of anti-hypertensive medication as measured by MMAS-8 items, which is a validated tool for the assessment of adherence to medication in this study was 68.45%. Meanwhile, in comparison with other countries, the adherence rate in our findings is slightly higher as demonstrated in Hong Kong (65.1%) by (H. J. Lee et al., 2017) and Palestine (63.2%) by (F. Alsolami, Hou, & Correa-Velez, 2012).

5.1 Association of Patients' Socio-Demographic and Adherence to Anti-hypertensive Treatment

Gender, marital status, age, work, and wealth status of hypertensive patients were found to have an association with adherence to anti-hypertensive treatment. This is consistent with the study by (Dhar et al., 2017). Female patients were reported to be 0.5 times less probable to comply with anti-hypertensive medication in comparison with males. This is consistent with studies by (Heydari, Kamran, Ahari, Biria, & Malepour, 2014), which found that women with long term clinical illnesses were less likely to adhere to medical treatment recommended by clinical specialist. Also, inadequate monitoring can be a reason for low levels of adherence among

University of Ghana http://ugspace.ug.edu.gh

females. However, other studies showed that females are more likely to adhere to medical treatments (Alesinskiy, 2016)

Also, age of hypertensive patients had significant association with adherence to anti-hypertensive treatment. Patients who are above 60 years were more likely to adhere to anti- hypertensive treatment than patients who are 60 years and below. Higher adherence to treatment among patients aged over 60 years could be explained by the assistance of family members or caregivers when taking their medications. This finding is consistent with what was reported by (Tong et al., 2016), which reported that adults less than 60 years are mostly engaged in working activities and family issues, and therefore may not have enough time to attend clinical appointments and take their drugs as prescribed by the medical specialist.

Furthermore, marital status was found to have significant association with adherence to anti-hypertensive treatment. For patients who were married, they were 8.289 more likely to adhere to antihypertensive medication. This finding is consistent with what was reported by (Dhar et al., 2017) and (Mekonnen, Gebrie, Eyasu, & Gelagay, 2017). Work status was found to have significant associations with adherence to anti-hypertensive treatment. Patients who worked in government institutions were 0.143 times more likely to adhere to antihypertensive treatment relative to their counterparts. This study is consistent with studies by (Lo et al., 2016).

Wealth status was found to have significant association with adherence to anti-hypertensive treatment. Rich patients were 3.352 more likely to be adherent to antihypertensive treatment as compared to patients who were poor. This finding is consistent with what was reported by (Dhar et al., 2017).

University of Ghana http://ugspace.ug.edu.gh

5.2 Association of Patients' Clinical Characteristics and Adherence to Anti-hypertensive Treatment

The duration of hypertension was found to have relations with treatment adherence in this study. Patients continuing with hypertension exceeding 3 years are less likely to adhere to anti-hypertensive medication than those with 1-3 years duration. It has been found out that the range and continuous kind of treatment cause tiredness to patients and cause them to switch resulting to poor adherence to anti-hypertensive treatment (Agyei-Mensah & De-Graft Aikins, 2010). This is consistent with studies by (H. J. Lee et al., 2017) and (Quine et al., 2012), which reported that the adherence to anti-hypertensive treatment can fall sharply after introducing patients with chronic diseases to medications or as a result of higher health care investment in persisting for anti-hypertensive cure.

Also, number of co-morbidities among hypertensive patients had significant association with adherence to anti-hypertensive treatment. Patients with more than one co-morbidities were less possible to comply with anti-hypertensive treatment than those with one number of co-morbidity. Patients with more than one co-morbidities could suffer from serious complications and complex treatment routines which prevent them from adhering to anti-hypertensive treatment. This finding is consistent with what was reported by (Ambaw et al., 2012) and (Dhar et al., 2017) that co-morbidities result in multiple usage of drugs, which possibly poses fear of side effects and therefore causes patients to stop their treatment.

Furthermore, blood pressure control was found to have significant association with adherence to anti-hypertensive treatment. For patients with blood pressure uncontrolled, they were 4.342 less likely to adhere to antihypertensive medication. Failure to adhere to medications resulted in poor

University of Ghana http://ugspace.ug.edu.gh

blood pressure control and increased risk of cardiovascular problems. This finding is consistent with what was reported by (Ho et al., 2009) and (Dhar et al., 2017).

5.3 The main barriers that hindered patient's adherence to anti-hypertensive treatment

Several barriers such as side effects of treatment, dosing frequency, complex medical regimens, low treatment satisfaction among patients, type of treatments such as diuretics, duration of treatments, and cost of treatment were identified to hinder constancy to anti-hypertensive treatment in Maamobi General Hospital in Ghana. The study shows that barriers to hypertensive treatment have an association with patients' adherence to anti-hypertensive treatment ($\chi 2 = 4.58$, P-value = 0.0044) with side effects of treatment being the prominent barrier hindering adherence to anti-hypertensive treatment. Most patients even informally expressed their disgruntlement about their experiences after taking in the medication but hinted that had it not been for the fact that just wanted to get better and be done with high blood pressure they would have stopped the medication even long ago. This is evident in the number of people who responded to this aspect of the barriers as enshrined in the data. This is consistent with the findings of (Irene A Kretchy, Owusu-daaku, Danquah, & Asampong, 2015); from the qualitative interviews, participants mentioned palpitations, frequent urination, recurrent bouts of hunger, erectile dysfunction, dizziness, headache, cough, physical exhaustion and weakness; a female participant reported, 'when I take the drugs I was given, in about 20–30 minutes my heart will be beating fast and even my whole body will be shaking …I urinate a lot and feel very hungry in the mornings'; moreover, the concern of a male participant was expressed in the following: 'I lose erection. That is the main thing that is worrying me so much. Sometimes I don't perform well sexually, my wife complains and there's a problem at home.'

University of Ghana http://ugspace.ug.edu.gh

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter presents a summary of the study, conclusions drawn from the findings and recommendations.

6.1 Summary

The main goal of this study was to investigate the adherence to anti-hypertensive treatment among adults attending outpatients' clinic at the Maamobi General Hospital. In furtherance, to identify the association between socio-demographic and clinical characteristics, and patients' adherence to anti-hypertensive treatment as well as the major barrier to the adherence. Chapter one covered the introduction, the statement of the problem, purpose and objectives of the study. Chapter two reported a review of previous studies associated with this topic. Chapter three described the detailed methodology of the study; it covers topics such as the approach employed by the study (quantitative research approach), explanatory research design and data analysis. Chapter four captured results: data and its analysis, and chapter five presented the discussion of results and findings.

6.2 Conclusion

The general objective which is the major target of this research work, is to determine the adherence to anti-hypertensive medication treatment among adults attending out-patients' clinic at the Maamobi General Hospital. As highlighted in the findings discussed earlier, 68.45% of the

University of Ghana http://ugspace.ug.edu.gh

patients adhered to medication. This is a good level of adherence since it is above average which indicates that hypertensive patients attending the hospital are doing quite well.

Socio-demographic characteristics such as gender, age, marital status, work status and wealth status have influence on adherence to anti-hypertensive medication treatment such that females are less adherent than males; older patients above 60 years are more adherent relative to those below that age than younger ones; married patients are more adherent than their counterparts; government workers do better than others; rich patients also do better than poor patients.

Clinical characteristics such as duration of taking medications, comorbidities and blood pressure control also have immense influence on adherence to medication treatment in that patients with the condition exceeding three years are less likely to adhere than patients below it; patients with two or more are less compliant to medication than those with one; patients with uncontrolled blood pressure are very non adherent than those with controlled blood pressure.

Side effects of medication, dosing frequency, complex medical regimes, low treatment satisfaction among patients, type of treatment such as diuretics, during of treatment, and cost of treatment have all been identified as barriers that hindered the patients' adherence to treatment medication. Meanwhile, chief among them is the side effects of medication.

6.3 Recommendations

Though, the outpatients of the Maamobi General Hospital are doing reasonably well with their medication treatment, there is still more room for improvement. It is against this backdrop that I recommend that, my institution, the School of Public Health, University of Ghana holds a stakeholder-meeting/forum with the Management of the hospital including other well-meaning

University of Ghana http://ugspace.ug.edu.gh

stakeholders to discuss the outcomes or outputs of this research and the way forward. The way forward may also be that leaflets, pamphlets amongst others are printed and distributed to not only antihypertensive outpatients but to as well people visiting the facility.

Furthermore, a higher target level of antihypertensive adherence should be set forth and patients well guided and helped to achieve this aim so as to help gradually reduce the burden of hypertension treatment on the state since it is said that, “little drops of water make a mighty ocean” because amelioration of the situation at one health facility which should recur at other facilities will eventually lead to a total improvement or eradication of the phenomenon countrywide.

University of Ghana http://ugspace.ug.edu.gh

REFERENCES

Addo, J., Agyemang, C., Smeeth, L., de-Graft Aikins, a, Edusei, a K., & Ogedegbe, O. (2012). A review of population-based studies on hypertension in Ghana. *Ghana Medical Journal*, *46*(June), 4–11.

Addo, J., Smeeth, L., & Leon, D. A. (2007). Hypertension in sub-Saharan Africa: A systematic review. *Hypertension*, *50*(6), 1012–1018.

Agyei-Mensah, S., & De-Graft Aikins, A. (2010). Epidemiological transition and the double burden of disease in Accra, Ghana. *Journal of Urban Health*, *87*(5), 879–897.

Akintunde, A., & Akintunde, T. (2015). Antihypertensive medications adherence among Nigerian hypertensive subjects in a specialist clinic compared to a general outpatient clinic. *Annals of Medical and Health Sciences Research*, *5*(3), 173.

Al-Jabi, S. W., Zyoud, S. H., Sweileh, W. M., Wildali, A. H., Saleem, H. M., Aysa, H. A., … Awang, R. (2015). Relationship of treatment satisfaction to health-related quality of life: Findings from a cross-sectional survey among hypertensive patients in Palestine. *Health Expectations*, *18*(6), 3336–3348.

Alesinskiy, M. (2016). Adherence to Antihypertensive Medication in the older hypertensive patients : the role of blood pressure measurement assistance treatment strategy, *4*, 90–94.

Alsolami, F., Hou, X.-Y., & Correa-Velez, I. (2012). Factors Affecting Antihypertensive Treatment Adherence: A Saudi Arabian Perspective. *Clinical Medicine and Diagnostics*, *2*(4), 27–32.

Alsolami, F. J. A. (2016). Factors Affecting Antihypertensive Medications Adherence among

University of Ghana http://ugspace.ug.edu.gh

Hypertensive Patients Attending a General Hospital in Jeddah City , Saudi Arabia Fatmah Jabr A Alsolami.

Ambaw, A., Alemie, G., W/Yohannes, S., & Mengesha, Z. (2012). Adherence to antihypertensive treatment and associated factors among patients on follow up at University of Gondar Hospital, Northwest Ethiopia. *BMC Public Health*, *12*(1), 282.

Ankrah, D. N. A., Koster, E. S., Agyepong, I. A., & Lartey, M. (2016). Facilitators and barriers to antiretroviral therapy adherence among adolescents in Ghana, 329–337.

Assah, F. K., & Mbanya, J.-C. (2009). Diabetes in Sub-Saharan Africa – Overview of a Looming Health Challenge. *Current Issues International Health and Diabetes*, *5*, 13–17.

Benner, J. S., Chapman, R. H., Petrilla, A. A., Tang, S. S. K., Rosenberg, N., & Schwartz, J. S. (2009). Association between prescription burden and medication adherence in patients initiating antihypertensive and lipid-lowering therapy. *American Journal of Health-System Pharmacy*, *66*(16), 1471–1477.

Bloom, B. S. (1998). Continuation of initial antihypertensive medication after 1 year of therapy. *Clinical Therapeutics*, *20*(4), 671–681.

Bosu, W. K. (2012). A comprehensive review of the policy and programmatic response to chronic non-communicable disease in Ghana. *Ghana Medical Journal*, *46*(2 Suppl), 69–78.

Bowry, A. D. K., Shrank, W. H., Lee, J. L., Stedman, M., & Choudhry, N. K. (2011). A systematic review of adherence to cardiovascular medications in resource-limited settings. *Journal of General Internal Medicine*.

Bray, G. A., Vollmer, W. M., Sacks, F. M., Obarzanek, E., Svetkey, L. P., & Appel, L. J. (2004).

University of Ghana http://ugspace.ug.edu.gh

A further subgroup analysis of the effects of the DASH diet and three dietary sodium levels on blood pressure: Results of the DASH-sodium trial. *American Journal of Cardiology*, *94*(2), 222–227.

Burnier, M. (2006). Medication Adherence and Persistence as the Cornerstone of Effective Antihypertensive Therapy. *American Journal of Hypertension*.

Cardoso, C. G., Gomides, R. S., Queiroz, A. C. C., Pinto, L. G., da Silveira Lobo, F., Tinucci, T., … de Moraes Forjaz, C. L. (2010). Acute and chronic effects of aerobic and resistance exercise on ambulatory blood pressure. *Clinics*, *65*(3), 317–25.

Caro, J. J., Salas, M., Speckman, J. L., Raggio, G., & Jackson, J. D. (1999). Persistence with treatment for hypertension in actual practice. *CMAJ*, *160*(1), 31–37.

Danaei, G., Finucane, M. M., Lin, J. K., Singh, G. M., Paciorek, C. J., Cowan, M. J., … Ezzati, M. (2011). National, regional, and global trends in systolic blood pressure since 1980: Systematic analysis of health examination surveys and epidemiological studies with 786 country-years and 5·4 million participants. *The Lancet*, *377*(9765), 568–577.

Dhar, L., Dantas, J., & Ali, M. (2017). A Systematic Review of Factors Influencing Medication Adherence to Hypertension Treatment in Developing Countries. *Open Journal of Epidemiology*, *07*(03), 211–250.

Esposti, L. D., Saragoni, S., Benemei, S., Batacchi, P., Geppetti, P., di Bari, M., … Esposti, E. D. (2011). Adherence to antihypertensive medications and health outcomes among newly treated hypertensive patients. *ClinicoEconomics and Outcomes Research*, *3*(1), 47–54.

Fagard, R. H., & Cornelissen, V. A. (2007). Effect of exercise on blood pressure control in

University of Ghana http://ugspace.ug.edu.gh

hypertensive patients. *European Journal of Cardiovascular Prevention and Rehabilitation : Official Journal of the European Society of Cardiology, Working Groups on Epidemiology & Prevention and Cardiac Rehabilitation and Exercise Physiology*, *14*(1), 12–7.

Giles, T. D., Materson, B. J., Cohn, J. N., & Kostis, J. B. (2009). Definition and classification of hypertension: An update. *Journal of Clinical Hypertension*.

Gosmanova, E. O., & Kovesdy, C. P. (2015). Adherence to antihypertensive medications: Is prescribing the right pill enough? *Nephrology Dialysis Transplantation*, *30*(10), 1649–1656.

Gwadry-Sridhar, F. H., Manias, E., Lal, L., Salas, M., Hughes, D. a, Ratzki-Leewing, A., & Grubisic, M. (2013). Impact of interventions on medication adherence and blood pressure control in patients with essential hypertension: a systematic review by the ISPOR medication adherence and persistence special interest group. *Value in Health : The Journal of the International Society for Pharmacoeconomics and Outcomes Research*, *16*(5), 863–71.

Hassan, N. B., Hasanah, C. I., Foong, K., Naing, L., Awang, R., Ismail, S. B., … Rahman, A. R. A. (2006). Identification of psychosocial factors of noncompliance in hypertensive patients. *Journal of Human Hypertension*, *20*(1), 23–29.

Heydari, H., Kamran, A., Ahari, Ss., Biria, M., & Malepour, A. (2014). Determinants of patient′s adherence to hypertension medications: Application of health belief model among rural patients. *Annals of Medical and Health Sciences Research*, *4*(6), 922.

Ho, P. M., Bryson, C. L., & Rumsfeld, J. S. (2009). Medication adherence: Its importance in cardiovascular outcomes. *Circulation*, *119*(23), 3028–3035.

University of Ghana http://ugspace.ug.edu.gh

Hussein, A. A. (2014). The " Epidemiological Transmission " and " Double-Burden of Disease ": A Focus on Africa. *Majmaah Journal of Health Sceince, 2*(2), 3–11.

Jolobe, O. M. P. (2012). A need, also, for transformative innovation in the definition of hypertension. *American Heart Journal*.

Kearney, P. M., Whelton, M., Reynolds, K., Muntner, P., Whelton, P. K., & He, J. (2005). Global burden of hypertension: Analysis of worldwide data. *Lancet*, *365*(9455), 217–223.

Kretchy, I. A., Owusu-Daaku, F. T., & Danquah, S. (2014). Locus of control and anti-hypertensive medication adherence in Ghana. *The Pan African Medical Journal*, *17 Suppl 1*(Supp 1), 13.

Kretchy, I. A., Owusu-daaku, F. T., Danquah, S. A., & Asampong, E. (2015). A psychosocial perspective of medication side effects , experiences , coping approaches and implications for adherence in hypertension management. *Clinical Hypertension*, 1–8.

Kretchy, I., Owusu-Daaku, F., & Danquah, S. (2013). Spiritual and religious beliefs: do they matter in the medication adherence behaviour of hypertensive patients? *BioPsychoSocial Medicine*, *7*(1), 15.

Kumar Praveen N, lHalesh. (2010). Antihypertensive treatment: a study on correlates of non adherence in a tertiary care facility. *International Journal of Biological & Medical Research*, *3*(4), 248–252.

Lee, G. K. Y., Wang, H. H. X., Liu, K. Q. L., Cheung, Y., Morisky, D. E., & Wong, M. C. S. (2013). Determinants of Medication Adherence to Antihypertensive Medications among a Chinese Population Using Morisky Medication Adherence Scale. *PLoS ONE*, *8*(4).

University of Ghana http://ugspace.ug.edu.gh

Lee, H. J., Jang, S., & Park, E. (2017). Effect of adherence to antihypertensive medication on stroke incidence in patients with hypertension: a population-based retrospective cohort study. *BMJ Open*, *7*(6), e014486.

Lo, S. H. S., Chau, J. P. C., Woo, J., Thompson, D. R., & Choi, K. C. (2016). Adherence to Antihypertensive Medication in Older Adults With Hypertension. *The Journal of Cardiovascular Nursing*, *31*(4), 296–303.

Lulebo, A. M., Mutombo, P. B., Mapatano, M. A., Mafuta, E. M., Kayembe, P. K., Ntumba, L. T., … Coppieters, Y. (2015). Predictors of non-adherence to antihypertensive medication in Kinshasa, Democratic Republic of Congo: a cross-sectional study. *BMC Research Notes*, *8*(1), 526.

Mazzaglia, G., Ambrosioni, E., Alacqua, M., Filippi, A., Sessa, E., Immordino, V., … Mantovani, L. G. (2009). Adherence to antihypertensive medications and cardiovascular morbidity among newly diagnosed hypertensive patients. *Circulation*, *120*(16), 1598–1605.

Mekonnen, H. S., Gebrie, M. H., Eyasu, K. H., & Gelagay, A. A. (2017). Drug adherence for antihypertensive medications and its determinants among adult hypertensive patients attending in chronic clinics of referral hospitals in Northwest Ethiopia. *BMC Pharmacology and Toxicology*, *18*(1), 27.

MOH. (2011). *National Policy for the Prevention and Control of Chronic Non-Communicable Diseases in Ghana*. Accra-Ghana.

MOH. (2014). *Ministry of Health*. Kenya: Ministry of Health.

Morisky, D. E., Ang, A., Krousel-Wood, M., & Ward, H. J. (2008). Predictive validity of a

University of Ghana http://ugspace.ug.edu.gh

medication adherence measure in an outpatient setting. *Journal of Clinical Hypertension*, *10*(5), 348–354.

Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and Predictive Validity of a Self-reported Measure of Medication Adherence. *Medical Care*, *24*(1), 67–74.

Naderi, S. H., Bestwick, J. P., & Wald, D. S. (2012). Adherence to drugs that prevent cardiovascular disease: Meta-analysis on 376,162 patients. *American Journal of Medicine*, *125*(9), 882–887.

Nguyen, H., Odelola, O. A., Rangaswami, J., & Amanullah, A. (2013). A review of nutritional factors in hypertension management. *International Journal of Hypertension*.

Omboni, S., Aristizabal, D., De la Sierra, A., Dolan, E., Head, G., Kahan, T., … Parati, G. (2016). Hypertension types defined by clinic and ambulatory blood pressure in 14 143 patients referred to hypertension clinics worldwide. Data from the ARTEMIS study. *Journal of Hypertension*, *34*(11), 2187–2198.

Osterberg, L., & Blaschke, T. (2005). Adherence to medication. *The New England Journal of Medicine*, *353*(5), 487–97.

Pagliaro, B., Santolamazza, C., Rubattu, S., & Volpe, M. (2016). New therapies for arterial hypertension. *Panminerva Medica*, *58*(1), 34–47.

Peco-Antić, A. (2008). Problems with current hypertension definition in children. *Srpski Arhiv Za Celokupno Lekarstvo*, *136*(1–2), 62–67.

Quine, L., Steadman, L., Thompson, S., & Rutter, D. R. (2012). Adherence to anti-hypertensive medication: Proposing and testing a conceptual model. *British Journal of Health*

University of Ghana http://ugspace.ug.edu.gh

Psychology, *17*(1), 202–209.

Rajpura, J., & Nayak, R. (2014). Medication adherence in a sample of elderly suffering from hypertension: evaluating the influence of illness perceptions, treatment beliefs, and illness burden. *Journal of Managed Care Pharmacy : JMCP*, *20*(1), 58–65.

Rindfleisch, A., Malter, A. J., Ganesan, S., & Moorman, C. (2008). Cross-Sectional Versus Longitudinal Survey Research: Concepts, Findings, and Guidelines. *Journal of Marketing Research*, *45*(3), 261–279.

Sacks, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D., … Lin, P. H. (2001). Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. *The New England Journal of Medicine*, *344*(1), 3–10.

Schiffrin, E. L., Calhoun, D. A., & Flack, J. M. (2016). Do we need a new definition of hypertension after SPRINT. *American Journal of Hypertension*, *29*(10), 1127–1129.

Sesso, H. D., Cook, N. R., Buring, J. E., Manson, J. E., & Gaziano, J. M. (2008). Alcohol consumption and the risk of hypertension in women and men. *Hypertension*, *51*(4 PART 2 SUPPL.), 1080–1087.

Taylor, A., & Shoheiber, O. (2003). Adherence to antihypertensive therapy with fixed-dose amlodipine besylate/benazepril HCl versus comparable component-based therapy. *Congest Heart Fail*, *9*, 324–332.

The Constitution of Ghana. (1992). *The Constitution of the Republic of Ghana* (Vol. 1). Accra: Ghana Assembly Press.

University of Ghana http://ugspace.ug.edu.gh

Tong, X., Chu, E. K., Fang, J., Wall, H. K., & Ayala, C. (2016). Nonadherence to Antihypertensive Medication Among Hypertensive Adults in the United States─HealthStyles, 2010. *Journal of Clinical Hypertension*, *18*(9), 892–900.

Urquhart, J. (1997). electronic medication event monitor. Lessons for pharmacotherapy. *Clin Pharmacokinet*, *32*, 345–356.

van der Laan, D. M., Elders, P. J. M., Boons, C. C. L. M., Beckeringh, J. J., Nijpels, G., & Hugtenburg, J. G. (2017). Factors associated with antihypertensive medication non-adherence: a systematic review. *Journal of Human Hypertension*, *31*(11), 687–694.

Vrijens, B., Antoniou, S., Burnier, M., & Sierra, A. De. (2017). Current Situation of Medication Adherence in Hypertension, *8*(March), 1–8.

WHO. (2008). *World Health Statistics 2008*. Geneva.

WHO. (2016). *Raised Blood Pressure: Situation and Trends*. Geneva, Switzerland.

University of Ghana http://ugspace.ug.edu.gh

APPENDICES

Appendix A: Consent Form

Title of study: ADHERENCE TO ANTI-HYPERTENSIVE MEDICATION AMONG ADULTS ATTENDING OUT-PATIENTS CLINIC AT THE MAAMOBI GENERAL HOSPITAL

Introduction

Good day. My name is Edinam Abena Voegborlo, I am doing my masters at the School of Public Health, University of Ghana. I am conducting a study on adherence to antihypertensive treatment in the polyclinic. I am going to give you some information and invite you to be a part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask me or another researcher.

Purpose of the study

The purpose of this study is to assess the adherence to antihypertensive treatment and factors that facilitate or hinder adherence and finally how social support affects adherence.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate, it will have no bearing on your job or on any work-related reports. You may change your mind later and stop participating even if you agreed earlier. Your refusal to participate will not affect the care you will receive.

University of Ghana http://ugspace.ug.edu.gh

Procedures

We will be asking you questions on socio-demographic information, history of condition, type of medications who are taking and for which duration, social support and adherence to medication. We are inviting you to take part in this research project. If you accept, you will be asked to participate in an interview with [***name of interviewer***] or myself. During the interview, I or another interviewer will sit down with you in a private, comfortable place at the [***location***]. If it is better for you, the interview can take place in your home or a friend's home. If you do not wish to answer any of the questions during the interview, you may say so and the interviewer will move on to the next question. No one else but the interviewer will be present, unless you would like someone else to be there.

Risks

We are asking you to share with us some very personal and confidential information, and you may feel uncomfortable talking about some of the topics. You do not have to answer any question or take part in the discussion/interview/survey if you don't wish to do so, and that is also fine. You do not have to give us any reason for not responding to any question, or for refusing to take part in the interview

Benefits

There will be no direct benefit to you, but your participation will help us understand factors that can affect adherence and therefore implement policies to increase adherence.

University of Ghana http://ugspace.ug.edu.gh

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so, and choosing to participate will not affect your job or job-related evaluations in any way. You may stop participating in the interview at any time that you wish without your job being affected.

Confidentiality

The information that we will collect for this research project will be kept private. You are not supposed to indicate you name and address in the research process.

Type of Research Intervention

This research will involve your participation in an interview that will take 30 to 45 minutes.

Participant Selection

You are being invited to take part in this research because you have been on antihypertensive treatment at the Maamobi Polyclinic and therefore provide very useful information in this regard.

Duration

The research project will last for 1 year in total. This interview will be conducted once and will last 30 to 45 minutes. We will not contact you further after this interview.

Reimbursements

You will not be provided with any remuneration in this study.

University of Ghana http://ugspace.ug.edu.gh

Sharing the Results

Nothing that you tell us today will be shared with anybody outside the research team, and nothing will be attributed to you by name. The knowledge that we get from this research will be shared with you and polyclinic before it is made widely available to the public.

Declaration of conflict of interest

I Edinam Abena Voegborlo (Principal Investigator), declare that, to the best of my knowledge, there is no potential conflict of interest that will or may arise as a result of my involvement with this study.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact any of the following: Edinam on 0247725755 or my supervisor Dr. Collins Ahorlu of Department of Epidemiology, Noguchi Memorial Centre for Medical Research on 0208195705 or contact Hannah Frimpong, Ghana Health Service/ Ethical Review Committee Administrator, P. O. Box MB 190, Accra. Tel: 0507041223, 0302681109.

Before taking consent

You can ask me any more questions about any part of the research study, if you wish to. Do you have any questions? Yes ☐ No ☐

(If yes, please, indicate the questions below)……

……

University of Ghana http://ugspace.ug.edu.gh

Certificate of Consent

I have been invited to participate in a research interview about adherence to antihypertensive treatment and told everything I need to hear about the study.

(This section is mandatory)

I have read the foregoing information, or it has been read to me in a language I understand. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I also agree that the interview should be recorded. I consent voluntarily to be a participant in this study

Name of Participant_____

Signature of Participant _____

Date _____

Day/month/year

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness_____ Thumb print of participant

Signature of witness _____

Date _____

University of Ghana http://ugspace.ug.edu.gh

Appendix B: Structured Questionnaire

	Variables	Responses	CODE
	SECTION A	**Socio-Demographic Characteristics**	
1	Age		
2	Sex	Male	0
		Female	1
3	What is the highest level of school you attended?	No formal Education	1
		Primary	2
		Middle/JHS	3
		Senior High/Senior secondary	4
		Certificate/Diploma	5
		Tertiary	6
4	Religion	Christianity	1
		Islam	2
		Traditional Africa Religion	3
		Others	4
5	Marital Status	Single	1
		Married	2
		Divorced	3
		Widow/Widower	4
		Separated	5
6	What is your main occupation?	Unemployed	1
		Private Business (Sole Proprietorship)	2
		Private Business (Joint Venture)	3
		Government Work	4
		Retired	5
		Others (Specific)	6
7	What is your ethnic group?	Akan	1
		Ewe	2
		Ga	3
		Mamprusi/Dagomba	4
		Others (Specific)	5
8	How much is your monthly income		
	SECTION B	**CLINICAL CHARACTERISTICS**	
9	Body Mass Index (BMI)	Normal	1
		Overweight	2

University of Ghana http://ugspace.ug.edu.gh

		Obese	3
10	Number of Comorbidities	None	1
		One	2
		Two	3
		Three	4
		Four and Above	5
11	Blood Pressure	Uncontrolled	0
		Controlled	1
12	Do you take medication for hypertension?	No	0
		Yes	1
13	What is the number of anti-hypertensive drugs you take?	Monotheraphy	1
		Two drugs	2
		Three and Above	3
SECTION C		**LIFESTYLE**	
14	Do you smoke	No	0
		Yes	1
15	Do you take alcohol	No	0
		Yes	1
16	Do you take any other medication apart from what is given to you in the hospital	No	0
		Yes	1
SECTION D		**HISTORY ABOUT HYPERTENSION**	
17	How long have you been on antihypertensive		
18	Which oral anti-hypertensive drug are you currently taking?	Diuretics e.g. Bendroflumethiazide, Hydrochlorthiazide	1
		Calcium-chanel blocker e.g. Nifedipine,Amlodipine ,Felodipine	2
		Beta-Adrenoceptor blocking drug e.g.Atenolol, Propranolol, Bisoprolol, Carvedilol	3
		Angiotensin-converting enzyme inhibitors (ACE) & Angiotensin-II-receptor blockers eg. Lisinopril ,Ramipril, Candesartan, Losartan ,Valsartan	4

University of Ghana http://ugspace.ug.edu.gh

		Methyldopa	5
		Others (Specify)	6
19	What is the total number of anti-hypertensive tablets you take daily?		
20	Do you experience any side effects when taking your anti-hypertensive drugs?	No	0
		Yes	1
	Apart from hypertension, do you have any other medical condition?	No	0
		Yes Indicate type	1
SECTION E		**BELIEFS ABOUT THE CONDITION**	
21	Do you feel that your hypertension is under control?	No	0
		Yes	1
22	Do you believe the medications are effective in reducing the blood pressure levels?	No	0
		Yes	1
23	Do you have someone reminding you to take your drugs as scheduled?	No	0
		Yes	1
24	Are you able to follow the advice given to you by your health professionals?	No	0
		Yes	1
25	Do you feel that you have any complications of hypertension?	No	0
		Yes	1
SECTION F		**HEALTH SERVICE RELATED FACTORS**	
26	Do you find waiting time at the clinic acceptable?	No	0
		Yes	1
27	Are you given the chance to state your problems and ask questions about your	No	0

University of Ghana http://ugspace.ug.edu.gh

	disease?		
		Yes	1
28	Do you have good relationship with doctor/health care provider	No	0
		Yes	1
29	Have you been educated on side effects of the medications you are given	No	0
		Yes	1
30	Have you ever been given a treatment and not receive supply because it was out of stock	No	0
		Yes	1
SECTION G MEASUREMENT OF ADHERENCE (MORISKY'S 8 ITEM ADHERENCE SCALE)			
31	Do you sometimes forget to take your medicines?	No	0
		Yes	1
32	People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past two weeks was there any days when you did not take your medicine?	No	0
		Yes	1
33	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	No	0
		Yes	1
34	When you travel or leave home, do you sometimes forget to bring along your medicine?	No	0
		Yes	1
35	Did you take all your medicines yesterday?	No	0
		Yes	1
36	When you feel like your blood pressure is under control, do you sometimes stop	No	0

University of Ghana http://ugspace.ug.edu.gh

	taking your medicine?		
		Yes	1
37	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	No	0
		Yes	1
38	How often do you have difficulty remembering to take all your medicine?	Never	1
		Rarely	2
		Once in a while	3
		Sometimes	4
		Usually	5
		All the time	6