ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS AMONG PATIENTS ATTENDING RIDGE HOSPITAL.

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

JULY, 2017
DECLARATION

I hereby declare that in exception of referenced works of other people which have been cited and duly acknowledged, this work is an output of my own research and initiative conducted under supervision, and that this research work has neither in whole nor in part been presented for an award of a degree elsewhere.

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DATE
DEDICATION

I dedicate this work to my husband and children.
ACKNOWLEDGEMENT

I acknowledge the instrumental contributions of my Supervisor, Dr. Irene Kretchy who’s effective and efficient supervision, guidance, support and prompt attention led to the fruition of this work. I thank Prof Adongo, the Head of Department, Social and Behavioural Sciences, School of Public Health, University of Ghana, and all teaching and administrative staff of the Social and Behavioural Sciences department for their diverse contributions during my study.

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I wish to register my sincere thanks to all persons who in diverse ways helped me in planning and executing this study but cannot be mentioned by name.
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<td>AHA</td>
<td>American heart foundation</td>
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<tr>
<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
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<td>ARBS</td>
<td>Angiotensin Receptor Blockers</td>
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<td>ASH</td>
<td>American Society Of Hypertension</td>
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<td>CDC</td>
<td>Center For Disease Control</td>
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<td>CVD</td>
<td>Cardiovascular Disease</td>
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<td>GMHS</td>
<td>Ghana Maternal Health Survey</td>
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<td>HBM</td>
<td>Health Belief Model</td>
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<td>HIV</td>
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<td>IRB</td>
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<td>JNC 8</td>
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<td>NCDs</td>
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<td>Out Patient Department</td>
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<td>UNICEF</td>
<td>The United National Childrens Fund</td>
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<tr>
<td>VALCO</td>
<td>Volta Aluminium Company Limited-Ghana</td>
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<td>WHO</td>
<td>World Health Organization</td>
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ABSTRACT

Introduction
Accurate medication adherence and self-efficacy to properly adhere to treatment is essential for every hypertensive patient. Poor adherence to hypertensive treatment regime is the most important single reason for disease complications such as cardiovascular and renal failures.

Method
The study was a cross-sectional study involving 350 hypertensive patients attending Ridge Hospital. The Morisky Medication Adherence Scale, health and facility related tool was used to obtain information from respondents. Data obtained were summarized as frequencies and percentages. Associations were then tested using Pearson’s chi-square test.

Results
About 50% of the hypertensive patients attending Ridge Hospital had low adherence rates. Patient related factors (p=0.001), and health facility related factors (p=0.001), adversely influenced patients’ ability to adhere to hypertensive medications. Medication adherence was also associated with some demographic features such as age (p=0.001), sex (p=0.001), educational level (p=0.001), employment type (p=0.001), and income level (p=0.001),

Conclusion
This study has shown that hypertensive patients attending Ridge Hospital have low adherence rates. Patient and health related factors adversely affected patients’ ability to adhere to hypertensive medication. Intensifying health education across users and providers may improve adherence rates among this population.
CHAPTER ONE

1.0 INTRODUCTION

This chapter provides background information for the study, describes the purpose and the objectives of the study and outlines the research questions which were used in achieving the stated objectives of the study.

1.1 Background

The World Health Organization (WHO) approximate the occurrence of hypertension in high-income countries as 35% for both genders, while in low, lower-middle and upper-middle income countries the prevalence is around 40% (WHO, 2007). According to the World Health Organization, hypertension is the number one risk factor for heart diseases (CVD), renal diseases and blindness (Saha, Sana, & Shaha, 2006). Hypertension over the years has remained a universal public health issue due to its continuous high occurrence and related risks of cardiovascular and kidney diseases (Kearney et al., 2005). A sum of one billion cases of hypertension was reported in the year 2000; with a future rise of about 30% by the year 2025. It is the number one cause of death; resulting in about 17 million deaths per year worldwide (WHO, 2013; Laryea, 2013). Presently, 1.6 billion people are affected with high blood pressure worldwide (WHO, 2016). Globally the overall occurrence of hypertension in adults aged 25 and over was around 40% in 2008 (WHO, 2015). Hypertension is expected to cause 7.5 million deaths worldwide yearly, about 12.8% of the total deaths from all causes (Mendis, Puska, & Norrving, 2011). The prevalence of hypertension from a study in seven Latin-American cities ranged from 13% to 29%, with an overall occurrence of 18% (Schargrodsky et al., 2008). Almost 65 million Americans are affected by hypertension (Ong, Cheung, Man, Lau, & Lam, 2007). Hypertension was one
of the ten top reported causes of death and about 4% deaths were due to hypertensive complications in Bangladesh (Saha, Sana, & Shaha, 2006).

In the United State of America for example, high blood pressure is listed on death certificates as the primary cause of death among Americans (American Heart Association, 2013). High blood pressure is reported to be a major risk factor contributing to more than 500,000 cases of stroke and one million myocardial infarction cases in the United States alone (Jamedu, 2006). The current prevalence of hypertension in many developing countries, is reported to be already as high as is seen in developed countries (Addo et al., 2012). Hypertension is one of the top causes of disabilities and mortality in Africa; with growing occurrence and mortality rates among adults. Additionally, it is one of the highest health problems after HIV/AIDS in the continent. Consequently, during the United Nations high level conference on Non-Communicable Diseases (NCDs) in 2011, member states were encouraged to deal with hypertension (Adeloye & Basquill, 2014). The comparatively high occurrence of hypertension in Africa has been connected to population growth and aging, increasing urbanization, mass relocation from rural to urban areas, and a high uptake of western lifestyles including tobacco and alcohol consumption (De-Graft Aikins et al., 2010; Adeloye & Basquill, 2014). The occurrence of raised blood pressure across WHO regions is highest in Africa with a rate of 46% for both sexes combined (WHO, 2016). A review of population based studies reported urban and rural prevalence of hypertension in Ghana as 54.6% and 19.3% respectively (Addo, Agyemang, Smeeth, De-graft Aikins, Eduesei, Ogedegbe).

It has been reported that hypertension in most countries in Africa is given less priority, resulting in fighting for the limited resources from a co-existing high burden of infectious
diseases (Beaglehole et al., 2011). Other factors such as poor standards of health service delivery, late detection and cost of medication contributes to the increased occurrence of hypertension in Africa (Hajar, Kotchen & Kotchen, 2006). According to Adeloye and Basquill (2014), in spite of reports of a higher frequency of hypertension in Africa compared to other regions, some professionals in Public Health are of the view that the real problem is still not known. In Ghana hypertension is the greatest cause of cardiovascular disease, cerebrovascular disease, chronic kidney disease and spontaneous unexpected mortality (Buabeng, Matowe, & Plange-Rhule, 2004). It also accounts for more than two-thirds of all medical admissions and more than 50% of all deaths in most health facilities in Ghana (Addo et al., 2012).

A person with hypertension is described as one with $\geq 140$ mmHg as systolic blood pressure, or $\geq 90$ mmHg diastolic blood pressure (JNC8, 2014). Information of hypertension, medication adherence and self-efficacy skills are some of the factors that might contribute to active care of hypertension (Gbenga et al., 2003). African Americans have low adherence to either life dynamics or prescribed treatment due to little education level, in some instances informal education, poor relationship with health care deliverers, information about treatments and their side effects, social and socio economic support, proximity to health care facility, psychological factors, lack of national health insurance, prolong and unending treatment, and mainly a lack of individual responsibility for his/her health (Hajjar & Kotchen, 2000).

Medication adherence means patients’ ability to follow a provider’s recommendation with respect to dosage, timing, and frequency of taking their prescribed medications (Ho et al., 2009). Patients’ adherence to therapy sometimes depends on the connection between the
patient and the health care provider (Brown et al., 2011). Manias et al., (2010) concluded that the influence of patients’ health beliefs, morals, communication skills, local language, lifestyle, social construction and support, and socioeconomic position must be taken into consideration when discussing about interventions to improve medication adherence. Problems in treatment adherence are widespread, and seriously compromise the effectiveness of antihypertensive treatment. Although the benefits of antihypertensive medications in controlling hypertension is reported, most patients fail to keep it under control as a result of poor adherence to treatment regime (Kretchy, 2014; Laryea, 2013; Jamedu, 2006). An earlier study by Haynes et al. (1976) came out that sufficient control of hypertension was connected with intake of at least 80% of a prescribed treatment. The patients’ capacity to notice a benefit from the intake of antihypertensive treatment is important in warranting adherence to therapy. Non-adherence level for hypertensive patients was reported to be 50% after 1 year and 85% after 5 years (Garfield et al., 2000). Numerous works on chronic disease therapy shows that patients usually stop their medications or refuse to take them because they see them as ineffective or experience unwanted side effects (Gimenes, Zanetti, & Haas, 2009). A patient’s ability to follow management plans to achieve results is regularly compromised by many obstacles such as, socio-economic, patient-related factors, health care team and system related systems, condition-related and treatment related (WHO 2003). Studies conducted in Ghana came out that 93% of the patients did not take their medications and 96% of the non-adherent patients was connected to unaffordable medication prices as the major cause of non-adherence (Buabeng et al., 2004; Jamedu, 2006; Kretchy, 2014; Laryea, 2013). Similarly, patient’s literacy or level of education, the extend of the disease and treatment regimen as well as patient beliefs and illness perceptions are perceived by some researchers to affect adherence to antihypertensive regime (Duah et al., 2013; Cooper et al., 2005; Laryea, 2013). Poor intake
of medications can result to treatment failure, condition progression; medication associated morbidity, medication tolerance and treatment resistance (Laryea, 2013).

There is a rising body of evidence that people who refuse to take medications as prescribed for heart condition suffer adverse health outcomes (Jamedu, 2006). In the USA, poor medication adherence has resulted in about 30% of therapy failure and 125,000 mortality yearly (Gupta et al., 2010). In Ghana, studies on medication adherence among patients suffering from high blood pressure is limited. It is therefore against this background that this study investigates adherence among hypertensive patients at the Ridge Hospital.

1.2 Problem Statement
High blood pressure is the commonest deadly risk factors for heart disease (CDC, 2015). Hypertension is a major cardiovascular problem. The prevention and control are therefore important to public health issues. Greater than 26% of the adult population globally have been diagnosed as suffering from hypertension, and the occurrence of hypertension rises with age (Kearney et al., 2004). Globally, it is also one of the major causes of premature death. To reduce morbidity and deaths among patients suffering from hypertension, there is a need to encourage adherence to prescribed medications and management regimen. Prudent blood pressure control is very essential in helping to eschew mortality rates (Lenfant, Chobanian, Jones & Roccella, 2003), and many studies have confirmed the effect of antihypertensive medications on positive medical results. Nevertheless, the usefulness of antihypertensive medications must be attained by ideal adherence to prescribed medications by the healthcare providers (Lee et al., 2013). Luscher (2013) stated that poor adherence to medication is an important health concern because it affects quality of life, productivity of the workforce and consequently can lead to disability and mortality. According to a study
by the American Heart Association, (2013) and Malmstrom et al., (2007) there are several factors influencing patients adherence to antihypertensive medication regimen which are broadly labelled as patient related or health facility related: information of medication, lengthy and ongoing therapy, educational level, literacy, and poor relationship with health care provider, views about medication and its side effects, psychological influences, social backing, socio-economics, proximity to health care facility, lack of national health insurance, asymptomatic ailment and problems. About one quarter of the deaths in Mamprobi, Accra over the 1975-1980 period was reported to be because of cardiovascular diseases of which hypertension is part (Bosu, 2010). Poor adherence to antihypertensive medication has led to a significant increase in the incidences of stroke, ischaemic heart disease, congestive heart failure, chronic renal disease and sudden death irrespective of age, gender and settlement area (Buabeng et al., 2004). According to Addo et al., (2012), low adherence to antihypertensive medications compromises the effectiveness of treatment, the quality of life of the patients and increases the burden on the limited resources of healthcare systems. Additionally, it is also associated with higher risk of hospitalization and mortality. In view of the consequences of non-adherence to anti-hypertensive medicines this study seeks to evaluate the factors associated with adherence to antihypertensive medications at Ridge Hospital.

1.3 Justification

According to the 2015 report submitted by Ridge Hospital, a total of 4,029 new cases of hypertension were diagnosed at the Out-patient Department (OPD) of the facility (Unpublished report, 2001). Furthermore, in 2001, the burden of healthcare costs placed by poor blood pressure control on Ghana alone was estimated at two billion dollars (Bosu, 2010). Accurate medication adherence and self-efficacy to properly adhere to a regime are
essential for every hypertensive patient (Breaux-Shropshire et al., 2012). The positive relationship between self-efficacy and medication adherence is one in which the patient is ready to follow the health care provider’s recommendations and realize that medication adherence will improve the disease outcome. The relationship between self-efficacy and medication adherence is especially important (Fernandez et al., 2011). Poor adherence to hypertensive treatment regime is the most important single reason for disease complications such as cardiovascular and renal failures (Addo et al, 2012). In view of the consequences of non-adherence to anti-hypertensive medicines, this study seeks to evaluate the factors associated with adherence to antihypertensive medications at Ridge Hospital. It is believed that findings of the study would help in improving awareness among patients and formal carers in the facility. In addition, the outcome of the study will help policy makers to develop appropriate strategies to minimize non-adherence to anti-hypertensive medicines at the Ridge Hospital and in Ghana generally.

1.4 Conceptual framework

The Health Belief Model (HBM) was the adopted theoretical framework for the conduct of this study (Hochbaum, 1952). The HBM suggests that a person's belief in a personal threat of an illness or disease together with a person's belief in their efficacy of the recommended health behavior or action will predict the probability of the person to adopt the behavior. The HBM states that an individual's course of action often depends on the person's opinions of the benefits and barriers related to health behavior. There are six components of the HBM. The first component of HBM is perceived susceptibility. This component assumes the person's personal perception of the risk of attaining an illness or disease. The second component of HBM is perceived severity. This component assumes a person's feelings on the significance of diminishing an illness or disease (or leaving the illness or disease
untreated). The third component of HBM is perceived benefits. This component assumes a person’s perception of the efficacy of various actions presented to lessen the threat of illness or disease (or to cure illness or disease. The fourth component of HBM is perceived barriers. This component assumes a person’s feelings on the obstacles to perform a suggested health action. The person would assess the effectiveness of the actions against the perceptions that it may be costly, unsafe, time-consuming, or troublesome. The fifth component of HBM is cue to action. This component assumes the stimulus required to start the decision-making process to admit a recommended health action. These signals can be internal (chest pains, wheezing, etc.) or external (advice from others, illness of family member). The sixth component of HBM is self-efficacy which refers to the level of a person's assurance in his/her ability to successfully perform a behavior. Self-efficacy is a concept in many behavioral theories because it directly relates to whether a person accomplishes the chosen behavior. The model is applicable to hypertension patients who want to manage their blood levels. For example, when the patient is diagnosed with hypertension, he/she will determine how severe the condition will impact his quality of life. Based on his perception on the severity of the illness, the patient will determine how the medication will benefit him and improve his/her quality of life. For example, to perceive the benefits of the medication (if the patient hesitates about the quality of it) the health care provider or a pharmacist should explain the positive aspects of adhering to the medicine, information about the medicine as it relates to other patients’ outcome who took this medicine, and/or give instructions in taking the medication and discuss the time in which it will take for the medication to take effect. As to the cues to action the patient may combine health care providers be consistent reminders to the patient on the necessity of taking the medicine, advising the patient to use a marked calendar in order not to forget to take the medicine. Bowry et al., (2011) states
that the patients who recognize high susceptibility, severity, benefit, and cue to action will have a higher adherence to medication compared to those who do not.

Figure 1: Conceptual Framework of Adherence to Antihypertensive Medication among patients attending Ridge Hospital.

1.5 Aim and objectives of Study

1.5.1 Aim of study

The purpose of this study was to ascertain the factors associated with adherence to antihypertensive medications among patients at the Ridge Hospital.

1.5.2 Objectives of study

(1) To assess the level of adherence of patients to antihypertensive medication at Ridge Hospital.

(2) To ascertain patient-related factors associated with adherence to antihypertensive medications in the hospital.
(3) To find out health facility related factors associated with adherence to antihypertensive medications.

1.6 Research Questions

1. What is the level of adherence of patients to antihypertensive medications at Ridge Hospital?

2. What are the patient related factors associated with adherence to antihypertensive medications at Ridge Hospital?

3. What are the health facility related factors associated with adherence to antihypertensive medications?
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This section presents reviewed literature on drug adherence among hypertensive patients, factors influencing adherence and ways of preventing poor adherence.

2.2 Background

Hypertension is a very serious risk factor for heart diseases and stroke. It is the primary reason of heart failure and the fourth leading cause of mortality in the U.S. (CDC, 2010). Hypertension is the cause of death of approximately 30% of adults in the US (CDC, 2002). Hypertension prevalence increases with age and drops with increasing income level (Gillespie and Hurvitz, 2013). In 2007–2010, high blood pressure prevalence among the adult population aged ≥18 was 27% while the age-adjusted prevalence of hypertension control was 48% (Yoon et al., 2013). Individuals who are 65 and older those with the highest rate of hypertension (72%), (Gillespie & urvitz, 2013).

De Lima et al., (2011) stated that African Americans are at a greater risk of hypertension; they are less inclined to optimal blood pressure with more negative outcome than that of white population. Age group, race/ethnicity, educational level, country of birth, family income, health insurance, diabetes, obesity, and disability status are the factors that affect hypertension prevalence (Kreatsoulas, 2010). Controlled hypertension has nothing to do with age, educational attainment, or income level (National Heart, Lung, and Blood Institute, 2003 & Bertoia et al., 2012). Since 1960, non-Hispanic African American adults are most susceptible for high blood pressure mortality (CDC, 2005–2008, 2011, 2012, & 2013). According to Beroia et al., (2012) Non-Hispanic African Americans had a higher
rate of hypertension (41%) than non-Hispanic whites (29%) and Hispanics (28%). According to Gillespie and Hurvitz (2013), adults born in the U.S. had a higher rate of hypertension (31%) than non-U.S. born adults (26%).

According to Warren-Findlow et al., (2011), to manage any chronic disease, including hypertension, one had to take care of his/her self. Bosworth, & Oddone (2002), believe that self-efficacy is especially important to hypertension self-care. Self-efficacy is also closely related with antihypertensive medication adherence (Fernandez et al., 2008 and Schoenthaler et. al., 2009) because if individuals do not have the knowledge and understanding to successfully medicate themselves, they may not take the medications as prescribed. It is very important to mention that self-efficacy is a changeable characteristic and, consequently, is open to intervention (Leventhal et al., 2008 & Marks et al., 2005). According to the American Heart Association (2013), in 2009, 61,762 individuals died because of high blood pressure listed as the primary cause of death, out of them there were 20,286 white males, 6,574 black males, 26,201 white females, and 6,951 black females. According to the same source, from 1999 to 2009, the death rate from high blood pressure increased 17.1 percent, and the actual number of deaths rose to 43.6 percent. The rate of the morbidity and mortality is so high that Healthy People (2020) decided to decrease the high blood pressure frequency among adults to 26.9% and to increase the prevalence of high blood pressure control amongst adults with hypertension to 61.2% (CDC, 2013).

Ghana is among the emerging and developing countries economically. It is considered as a country which has not achieved a lot in relation to industrialization (Modern Ghana, 2009). The prevalence of hypertension in Ghana is estimated at 54.6% for urban Ghana and 19.3% for rural Ghana (Addo et al., 2012).
Factors such as rate of literacy, general life expectancy, population growth have great impact on the general standard of living of the population. Ghana has over the years remained essentially an agricultural economy. The country achieved a 6.4% growth rate in 2007 (UNICEF 2010; Modern Ghana, 2009). According to WHO (2009), deaths as a result of non-communicable diseases such as hypertension will increase by 17% over the next decade, with the greatest increase in the African region (27%). However, primary prevention has been proposed as more than 500,000 women between the ages of 19 and 49 are estimated to have died in developing countries each year due to hypertensive-related causes. Research reveals that women with pre-existing or chronic high blood pressure are more likely to have complications during pregnancy than those with normal blood pressure (Ashutosh et al., 2008). Previous studies have shown hypertension as one of the major causes of maternal death in Ghana (Ghana Maternal Health Survey, 2007). However, to a considerable extent, the growth and effectiveness of reducing maternal death by means of prevention and treatment of hypertension has not been effective even though it can be prevented. In addition, a research conducted in Uganda concluded that approximately one in every three adults aged 20 years or older was hypertensive. Prevalence of 30.5% and higher prevalence of hypertension in females in this study suggested that advancing in age was a risk factor due to exposure to lifestyle risk factors (Wamala et al. 2009.) A recent research showed a huge gab on the statistics of hypertension in industrialized, developed and the least developed countries (Drife 2008)

2.3 Definition and classification of hypertension

According to JNC8 (2015), high blood pressure is defined as BP ≥140/90 millimeters of mercury (mmHg). The overall occurrence is similar between both men and women, but differs with age. For those younger than 45 years, old, high blood pressure is more common
in men than women. For those 65 years, old or older, high blood pressure affects women more than men. African Center for Disease control defines “High blood pressure as a common condition in which the force of the blood against your artery walls is high enough that it may eventually cause health problems, such as heart disease”. Borghi et al., (2011) stated two types and four stages of hypertension as primary or essential hypertension and secondary hypertension. In primary hypertension, the blood volume in the body is abnormally high and gradually develops over the years. The risk factors associated with essential hypertension include ethnicity (common among African Americans), 35 years of age and older, family history of hypertension, high salt intake, stress, insulin resistance, low physical activity, obesity, smoking, alcohol consumption, and aging process. Secondary hypertension is caused by pre-existing conditions such as chronic kidneys disease or endocrine system impairments (American Heart Association, 2014). Hypertension is often called a “silent killer” because many people have it and don’t know about it. That’s why regular BP control is vitally necessary if you want to live a long healthy life. De Lima et al., (2011) stated that African Americans are at a greater risk of hypertension; they are less inclined for optimal blood pressure with more negative outcome than that of the white population.

The American Society of Hypertension (ASH), defines hypertension as “a progressive cardiovascular syndrome, arising from complex and interrelated etiologies (Giles, 2005). Early markers of the syndrome are often present before blood pressure elevation is observed; therefore, hypertension cannot be classified solely by discrete blood pressure thresholds. Progression is strongly associated with functional and structural cardiac and vascular abnormalities that damage the heart, kidneys, brain, vasculature, and other organs, and lead to premature morbidity and death” (Giles, 2005). ASH classifies four forms of hypertension,
“normal” and three others (Chobanian et al., 2003). According to ASH, Stage 1 includes the patients who were earlier classified by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) as pre-hypertensive; they do have cardiovascular risk factors or earlier signs of disease, but their heart is not damaged. Their blood pressure levels are usually between 120/80 mm Hg and 139/89 mm Hg. Stage 2 includes hypertensive patients whose BP is ≥ 140/90 mm Hg and/or who have two or more disease signs or evidence of early organ damage. Stage 3 includes hypertensive patients whose BP is ≥ 140/90 mm Hg and/or clinical proof of obvious organ damage or CVD or have suffered cardiovascular diseases. Yet, there exist different opinions concerning the “new” definition. Koslis et al., (2005) believe that “new” definition is more exact and essential because it presents a more complete picture of hypertension. According to the author, using JNC 7 classification was challenging for physicians because they have to think of separate risk factors besides high blood pressure, for example cholesterol and diabetes. However, Materson (2005), though thinking that the new definition is “noble,” acknowledges that such definition is rather complicated and that’s why it is difficult for the physicians to make proper treatment decisions (Materson, 2005).

According to the Ministry of Health in Ghana, Hypertension is a condition in which the blood pressure of an adult aged 18 years or older is persistently higher than 140/90 mmHg in a non-diabetic, or above 130/80 mmHg in a diabetic, based on the average of two or more properly measured blood pressure readings (Ministry of Health, 2015). Hypertension carries an increased risk of early death from stroke, heart attack, heart failure and kidney failure if not properly controlled. Once a diagnosis of hypertension is made, the individual should be monitored regularly and treated for life with non-drug measures, or a combination of this and appropriate medications. In most patients, no specific underlying cause is identified. Such patients are said to have essential hypertension. Risk factors associated with this type
of hypertension include increasing age, family history, excess body weight and excessive alcohol intake. In about 10-15% of cases, hypertension may be due to a specific disease or abnormality such as kidney disease, coarctation of aorta and endocrine disorders. These conditions are said to cause secondary hypertension. To reduce cardiovascular, cerebrovascular and renal complications by maintaining blood pressure levels of 140/90 mmHg or less (130/80 mmHg or less in diabetics) (Materson, 2005).

2.4 Diagnosis and Measurement

Usually, blood pressure is presented in two numbers, the top, systolic and the bottom, diastolic. Systolic pressure shows the pressure when the heart is beating while diastolic pressure indicates when the heart is resting between beats. American Heart Association (2014) considers that normal blood pressure is below 120/80 mm Hg. Adults who have systolic BP from 120 to 139 and diastolic BP is 80 to 89 (or both) are “pre-hypertensive.” Those patients who have a systolic pressure of 140 systolic or higher and/or 90 diastolic or higher that stay high over time are “hypertensive” (American Heart Association, 2014). Joint National Committee (JNC8) (2015) classification of blood pressure in adults (18 years and older) is based on the average of two or more properly measured blood pressure readings from two or more clinical visits. If the systolic blood pressure and diastolic blood pressure values fall into different categories, the overall classification is determined based on the higher of the two blood pressures. Blood pressure is classified into one of four categories: normal, prehypertension, stage1 HTN and stage 2 HTN. Prehypertension is not considered a disease, but identifies those who are likely to progress to stage 1 or stage 2 HTN in the future.
2.5 Medication adherence

Medication adherence is usually understood as whether patients take their medications regularly as they are prescribed as well as they continue to take them for a needed period. Medication adherence behavior can be divided into two main concepts: adherence and persistence; adherence denotes the number of drugs used during a certain period while persistence means far-reaching duration of drug therapy (Caetano et al., 2006; Cramer et al., 2008). Patients with high BP who regularly take prescribed medications constitute 72% and those with gout constitute 38% (Briesacher et al., 2008).

Medication adherence is of special attention to clinicians, healthcare systems, and other investors because the numbers of medication non-adherence is rampant and very much related to the adverse outcomes and higher costs of care (Osterberg et al., 2005). According to Gurwitz et al., (2003), the situation with medication adherence in the US is especially serious because the U.S. populations are getting older and have to take more medications to treat chronic diseases. Only 51% of Americans treated for hypertension are adherent to their long-term therapy (CDC’s Noon Conference, 2013). Scientists mention different reason of poor adherence such as poor communications between healthcare providers and patients, fear of side effects, high medication costs, interaction with other prescriptions, and simple forgetfulness (National Council on Patient Information and Education, 2013).

In a systematic review by Abegaz et al., (2017) using 28 studies from 15 countries, non-adherence rates of 45.2% among participants was observed. In a related study by Bilal et al., (2015) conducted in India among individuals 30 years and above using 113 indoor hypertensive patients, 64.1% of the patients did not adhere to their hypertension medication. Ton et al., (2016) using 4198 adults aged 18 years and above reported a non-adherence rate
of 30.5% among hypertensive adult respondents. Tomaszewski et al., (2014) reported a lower rate of non-adherence to hypertensive medications among 208 hypertensive patients. Overall, 25% of the patients were non-adherent to their medications. A similar study conducted in Saudi Arabia by Ghobain et al., (2016) also involving 302 hypertensive patients reported a lower rate. About 12.3% of the respondents did not adhere to their hypertensive medications. In Nigeria, Akintunde & Akintunde (2015) using 114 hypertensive subjects and employing the Morisky 8 questionnaire observed a non-adherence rate high of 36.8%, low 23.9% and medium of 39.5%. In Ghana, a study by Attipoe (2014) among UN peacekeeping mission who were hypertensive revealed an extremely high non-adherence of 98.4%.

Medication adherence is necessary for the patients who suffer chronic diseases such as diabetes, heart disease and cancer. According to US Centers for Disease Control and Prevention (2008), approximately one in two Americans have chronic disease, and to treat such patients, the government spends three out of every four on medical expenses. To improve patients’ attitude towards the prescribed medication, it is necessary to encourage adherence to prescribed medications, and to avoid costly emergency department visits and hospitalizations (American Heart Association, 2009).

To close the adherence gap means to improve the quality of health care, to stimulate better chronic care supervision, and to promote better health outcomes. Some researchers concluded that adherence proportions during the first year of therapy across a range of chronic medical conditions are usually treated with conservation therapy (Briesacher et al., 2008). Claxton et al., (2001) add that electronic monitoring studies show that even chronically sick patients who regularly make refills of their prescriptions take only half of
their doses. Claxton et al., (2008) also stated that adherence is in close proportion to the number of times a patient must take their medicine each day. The average adherence for the patient who take their medication only once a day constitute approximately 80% in comparison to about 50% for those patients who have to take medications four times a day (Briesacher et al., 2009). Gwadry-Sridhar et al., (2009) admits that patients are more ardent to taking their medication a day before or after seeing their physician. Pan et al., (2008) showed that medication adherence increase by almost 13% if patients take a fixed-dose combination of two diabetes medicines in comparison to those who take two separate diabetes medicines. The same can be said about hypertensive patients, the adherence to hypertensive medications rises to 80% if patients take a fixed-dose combination and less than 70% will adhere to hypertensive medications if they take two separate medicines.

Side effect is another factor that reduces medication adherence. Patients who report that they have side effects are 3.5 times less likely to be adherent to (Taira et al., 2006). medication. Hypertensive patients who do not feel any side effects have significantly better adherence for over a four-year period (Conlin et al., 2001). Even commercially insured patients who are treated for hypertension indicated significantly better adherence among the patients who take angiotensin receptor blockers (ARBs) than among those taking several other types of antihypertensive medicines, despite a considerably higher out-of-pocket payment for ARBs (Taira et al., 2006).

Poor adherence to antihypertensive medications can bring either adverse results such as stroke or myocardial infarction (Chobanian et al., 2003; Munger et al., 2007) or can make primary physician increase the dosage of antihypertensive medications or add additional antihypertensive medications. Munger et al., (2007) believe that such aspects as female
gender, younger age, higher education, higher socioeconomic status, and fewer antihypertensive drugs are related to higher rates of medication adherence.

2.6 Factors associated with medication non-adherence

According to Jin et al., (2008) there are several factors that are related to therapeutic non-adherence. These factors may be divided into patient-centered factors, therapy-related factors, social and economic factors, healthcare system factors, and disease factors. Ogedegbe et al., (2003) Elliott et al., (2008), and Kressin et al., (2007) have all reported that there are many barriers to drug adherence such as a higher number of antihypertensive agents, adverse effects, low socioeconomic status, and private beliefs concerning the treatment of hypertension. Jin et al. (2008) admitted that the impact of some of these factors is undisputable, while others’ might cause contradiction. Fischer et al., (2010) stated that non-adherence to even basic medications have become a significant public health problem. Numerous studies reveal that newly prescribed medications necessary for the treatment of diseases such as chronic hypertension (28.4%), hyperlipidemia (28.2%), and diabetes (31.4%) are identified as not adherent (Fischer et al., 2010). The numbers of morbidity and mortality in chronic diseases are closely associated to medication non-adherence (Ho et al., 2006; Sokol et al., 2005). Many people stop taking medications just after filling the first prescription (WHO, 2003) which is identified as “primary adherence” and is a very important step because taking medicines at the beginning of treatment for both acute and chronic diseases is necessary (Andrade et al., 2006).

For example, Vrijens et al., (2008) found out that about 50% of hypertensive patients stop taking antihypertensive medications within one year since the initial prescription. Vrijens et al., (2008) also state that on any one day, hypertensive patients omit approximately 10% of the prescribed doses of hypertensive medications. Intentional non-adherence is an active
process when the patient deliberately chooses to stop taking medications himself/herself (Lowry et al., 2005). Unintentional non-adherence is passive in which patients are most likely to be either careless or forgetful about adhering to the treatment regimen (Vrijens et al., 2008). Non-adherence causes approximately from 30% to 50% of treatment failures and 125,000 deaths annually (CDC, 2013).

In addition, non-adherence to cardio protective medications increased risk of cardiovascular hospitalizations (10% to 40%) and mortality (50% to 80%). Poor adherence to heart failure medications increase the number of cardiovascular-related emergency department visits. About 20% to 30% of patients never fill the prescribed medication, and 50% of patients do not make refills of the prescribed medications (CDC, 2013). According to American Heart Association (2014), almost half of 187 million of American patients do not take prescribed medication. According to National Health and Nutrition Examination Survey, African Americans have the highest prevalence of hypertension in the United States, which is almost 32% of the adult population (CDC/National Center for Health Statistics, 2000). With that, the sixth report of the Joint National Committee on Prevention Detection (1997) state that African Americans’ poor adherence to prescribed antihypertensive medications is the main obstacle on the way to regular blood pressure control and, consequently, to a healthy life.

In Africa, Medication adherence is related to many factors. These include patient history, demographic characteristics, clinical variables, knowledge, beliefs, behavior, health care provider relationships, and health system influence (Akintunde and Akintunde, 201). Studies have shown a relationship between low antihypertensive medication adherence, uncontrolled blood pressure and increased risk of cardiovascular morbidity and mortality (Laryea, 2013; Jamedu, 2006). Social, psychological, physical and economic factors have a
significant impact of antihypertensive medication adherence (Jamedu, 2006). The level of information provided to patients may also impact on the level of adherence to medications. There are other important determinants of medication adherence among Nigerian hypertensive subjects, and there are few studies to that effect. Mukora-Mutseyekwa and Chadambuka (2011) reported adherence rate of 40.2% in a study in a family practice clinic in Zimbabwe while Lee et al. (2005) reported a prevalence of good adherence of 65.1% (Dennison et al., 2007). Although studies from other African countries (Ndumle et al., 2010; Amira and Okubadejo, 2007) reported that non-adherence is related to unaffordable drug prices and lack of finances to acquire antihypertensive medication, others showed no influence of paying to get anti-hypertensive medication (Wariva, 2014). In Ghana, recent studies by Boima et al (2015) showed a prevalence of 66.7% for hypertension medication non-adherence. In 2014, Kretchy et al. (2014) reported poor medication adherence among 93.3% hypertensive patients from two teaching hospitals from northern and southern Ghana.
CHAPTER THREE

3.0 METHODOLOGY

3.1 Research Design

A quantitative cross-sectional research design was used in this study. Quantitative research is used to answer questions about relationships among measurable variables with the purpose of explaining, predicting and controlling phenomena (Leedy & Ormrod, 2005). This information was obtained only once from each respondent during the study period. A descriptive questionnaire comprising of five sections was used to obtain this information. The main outcome variables were level of adherence to antihypertensive drugs.

3.2 Research Setting

The study site was the Ridge Hospital. It is located along the castle road and opposite the VALCO Trust House in Accra. It occupies a total land area of about 15.65 acres and falls within the Accra Metropolitan Area of the Greater Accra Region. It is a Ghana Health Service level ‘A’ facility and serves as a referral point for about 16 district hospitals in the region. It has 240 beds and its immediate catchments area includes Nima, Maamobi, Kanda, Accra New Town, Kotobabi, Osu, La, Adabraka, Achimota and Central Accra. The hospital was upgraded to the status of a regional hospital in 1997. Currently, it provides a whole range of general and specialist services to people within and beyond its catchment area. The hospital apart from Outpatient services, also provided services to patients who are admitted
to the ward. An average of about 500 cases are seen general every day in the hospital. The hospital has medical, surgical, and paediatric departments.

Source: Google map, 2016

3.3 Population

The target population is the total group of participants about whom the investigator is interested and to whom the results could reasonably be generalized (Polit & Hungler, 1995). The population of this study comprised all patients diagnosed with hypertension at Ridge Hospital. These people were surveyed as the target group because they possess characteristics that the researcher was looking for and had the ability to provide answers to the research questions.

**Inclusion Criteria**: The criteria for inclusion in this study were hypertensive patients who had been on antihypertensive medication for not less than six months and were 18 years and above. They should be able to speak English, Ga or Twi.
**Exclusion Criteria:** The criteria for exclusion were patients attending Ridge Hospital who had been on medication for less than six months and were below 18 years. Those who were unable to speak English, Ga or Twi were excluded.

### 3.4 Sample and Sampling Techniques

The level of drug adherence among hypertensive patients according to Boima et al. (2015) in Ghana is 67%. The researcher therefore used this prevalence in arriving at the minimum sample size for the study.

Thus; 

\[ n = \frac{Z^2 \times p \times q}{e^2} \]

\[ n = 1.96^2 \times (0.67\times0.33)/0.05^2 \]

where:

- **n** = sample size
- **Z** = percentile for 95% significance level for normal distribution (1.96)
- **P** = Prevalence of what is being studied (drug adherence = 67% = 0.67)
- **Q** = 1 - **P**
- **e** = margin of allowable error (0.05)

With an alpha of 0.05 and a statistical power of 80%, 339 clients were computed as minimum sample size. This sample size was upwardly adjusted to 350 to compensate for contingencies such as non-response and recording errors.

According to Polit & Beck (2010), quantitative researchers should select the largest sample possible so that it is representative of the target population to make it possible for generalization of findings. A systematic sampling method was used in this study. This method samples members from a larger population according to a random starting point and
a fixed periodic interval. This interval, called the sampling interval, was calculated by dividing the population size by the desired sample size. Despite the sample population being selected in advance, systematic sampling is still thought of as being random if the periodic interval is determined beforehand and the starting point is random. All eligible hypertensive patients who fell within the inclusion criteria and able to speak English, Ga, Twi were recruited with the help of the nurses after they have been duly informed.

3.5 Training of research assistants

In this study, four (4) Research Assistants with adequate hypertension knowledge and skills were employed. They were trained on how to administer the questionnaire, translate technical terms into local language, how to ensure that the dignity and human rights of the participants were adhered to, and how to obtain written consent from all participants before questionnaires are administered.

3.6 Pretesting

Pretesting of the questionnaire was done before the commencement of the actual study. The questionnaire was pretested on fifteen (15) hypertensive patients in the study area. This ensured that ambiguities and inconsistencies are corrected before commencement of the study. A Cronbach alpha of 0.86 was obtained. The pretest resulted in changing the wording of questions 4, and 9. Question 14 was dropped as it was identified as the same as question 11.

3.7 Research Instrument (Morisky Medication Adherence Questionnaire)

According to Enarson, Kennedy, Miller & Bakke (2001), questionnaire is the frequently used instrument for data collection in quantitative research. A well-designed questionnaire
should collect accurate and reliable data which are simple, relatively inexpensive and yet can provide information from a large member of subjects (Awases 2006). A semi structured questionnaire Morisky Medication Adherence questionnaire developed in accordance with the objectives of the study was used as the main tool for the data collection. The questionnaire consisted of four sections (A, B, C, D). Section A comprised of 8 questions related to respondents’ demographic characteristics; Section B comprised of 4 questions related to medication adherence from the Morisky Medication Adherence Questionnaire (Morisky, Ang, Krousel-Wood, Ward, 2008) validated questionnaire. Section C dealt with patient related factors of medication non-adherence and comprised of 14 questions. Finally, section D comprised of 7 related questions on health facility related factors of medication non-adherence. All three sections (B, C, D) were scored and their scores summed up as a composite score for each section. The summed scores were then converted to percentage and interpreted.

3.8 Data Gathering Procedure

Following clearance (GHS-ERC:142/02/17) and permission to conduct the study from the Institutional Review Board of the Ghana Health Service, the researcher went ahead to collect data. Each respondent was approached individually during which the nature and purpose of the study as well as confidentiality and right of withdrawal was explained to him or her. A consent form was given to the respondents to sign or thumb print before the questionnaires are distributed to them. Those who were unable to read in English were read to in Twi or Ga for them to understand and sign or thumb print by trained research assistants. To ensure confidentiality and anonymity, no names or identifying information of the participants were included in the questionnaire. Trained research assistants aided respondents in the process and each respondent were given 45-60 minutes to complete the questionnaires after which
the research assistants collected them and kept them in sealed A3 envelopes. Further explanations were provided for those who needed them in order to elicit adequate responses from them.

3.9 Data analysis

STATA 13.0 was used for data analysis. Data obtained was entered into the software and cleaned. It was then coded using numeric values (e.g. marital status with options married, single, separated will be coded as 1=single, 2=married, 3=separated), this helped to reduce the level of entering errors. For socio-demographic categorical data (e.g. age, ethnicity), summary tables of counts and percentage were presented with respect to these characteristics. For socio-demographic continuous data (e.g. age), summary tables of means, standard deviations and ranges were presented. In some cases, graphical presentations were provided to highlight the level of differences. In cases of sparse data (less than 5% observation), to avoid bias on the conduct of analysis, the assessments of respondents in such categories were excluded. Univariate analysis of frequencies was reported for all categorical variables. Bivariate analysis using Chi square test was used to test for association between selected demographic characteristics and medication adherence. Further test of associations between explanatory variables such as age, educational level, marital status employment and outcome of interest (level of drug adherence) was done. Medication adherence was defined by calculating a composite score for the 8 questions in Morisky Medication Adherence questionnaire. A score of 8 was interpreted as High, 6-7 as moderate and below 6 as low adherences. P-value of less than 0.05 was used to denote statistical significance.
3.10 Validity and Reliability

Panneerselvam (2010) refers to validity as the degree to which research instrument measures what it is designed to measure. Reliability denotes the degree of consistency or dependability with which the instrument measures the attributes it is designed to measure. The data obtained was cleaned and checked for duplicate entries and entry errors before running descriptive frequencies of all the variables. Coding was done to prevent typographical errors. Finally, frequencies and percentages were checked to see if they added up to sample size and 100%.

Validity was ensured by using a validated questionnaire and ensuring that supervisors looked at it for language use by the researcher and supervisors and modifications incorporated where necessary. A pretest was also done using 15 respondents with similar characteristics as the study population. The aim was to determine whether the instrument was clearly worded and able to solicit the type of information envisioned. A Cronbach alpha of 0.86 was obtained. The research assistants who were used had adequate knowledge on the study and were also trained in the administering of questionnaires and obtaining of informed consent. There was regular monitoring by the field supervisor at the study area to review questionnaires presented by the field staff.

3.11 Ethical Considerations

The researcher first obtained permission from the Ghana Health Service, management of Ridge Hospital and the patients themselves. The purpose of the study, assurance of confidentiality and the right of withdrawal was explained to participants. A consent form was provided to respondents to confirm their voluntary participation in the study. Codes were used to ensure that the identity of respondents is not revealed. To maintain anonymity,
individual participants were given I.D numbers and confidentiality was assured. All documented information given by participants was stored under lock and key and passwords were used to protect soft copies. The data will be made available only to supervisor and possibly authorities from the Ghana Health Service Ethics and Protocol Review Board or Institutional Review Board (IRB) if required.
CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics

This section describes the demographic characteristics of respondents in the study. A total of three-hundred and fifty (350) respondents were randomly selected and surveyed in this study. Age distribution was fairly distributed among the various age groups. However, close to a third of the respondents were in age groups 35-44 and 45-54 years while only 21 (6.0%) were in age group 25-34 years. Close to half of the respondents 156 (44.6%) had tertiary level education while 34 (9.7%) had no formal education. More than half of the respondents were married while 65 (18.6%) were single. Most respondents 233 (66.6%) were employed. Less than half of respondents’ spouses 165 (47.1%) were employed. Less than half of the respondents 131 (37.4%) were into skilled employment. Income level was also fairly distributed among respondents (Table 1).
Table 1: Respondents’ demographic characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
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<tr>
<td>25-34</td>
<td>21</td>
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</tr>
<tr>
<td>35-44</td>
<td>97</td>
<td>27.7</td>
</tr>
<tr>
<td>45-54</td>
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<td>55-64</td>
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<tr>
<td><strong>Level of education</strong></td>
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<tr>
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<td>9.7</td>
</tr>
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<td>15.4</td>
</tr>
<tr>
<td>JHS</td>
<td>53</td>
<td>15.1</td>
</tr>
<tr>
<td>SHS</td>
<td>53</td>
<td>15.1</td>
</tr>
<tr>
<td>Tertiary</td>
<td>156</td>
<td>44.6</td>
</tr>
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<td><strong>Marital status</strong></td>
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<tr>
<td>Married</td>
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</tr>
<tr>
<td>Single</td>
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<td>18.6</td>
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<td>Separated/Divorced</td>
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<td>10.9</td>
</tr>
<tr>
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</tr>
<tr>
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<td>33.4</td>
</tr>
<tr>
<td><strong>Spouse employment</strong></td>
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<tr>
<td>Employed</td>
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<tr>
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</tr>
<tr>
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<td>167</td>
<td>47.7</td>
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<td>6.9</td>
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<td><strong>Duration of condition (years)</strong></td>
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<td></td>
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<td>14.6</td>
</tr>
<tr>
<td>&gt; 9</td>
<td>86</td>
<td>24.6</td>
</tr>
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</table>

4.2 Medication Adherence

This section provides information on all 8 items of medication adherence as described by Morisky (Morisky, Ang, Krousel-Wood, Ward, 2008). Close to two-thirds of the
respondents 69.4% reported they sometimes forget to take their high blood medication. Close to half 179 (51.1%) reported that over the past two weeks there were days in which they did not take their drugs. More than half of the respondents 185 (52.9%) reported that they have in sometime cut down on their medication because they felt worse. However, less than half of the respondents 170 (48.6%) reported that they sometimes forget to take their drugs when they travel or leave home. Majority of the respondents 234 (66.9%) reported that they took their medications the previous day prior to data collection while less than half 167 (47.7%) reported that they stopped taking their medication when they felt their blood pressure was under control. Finally, less than half of the respondents reported that taking the medication everyday was a real inconvenience for them and they also had difficulty in remembering to take their medication.

4.3 Level of medication adherence

Medication adherence was low in 175 (50%) of the respondents while 77 (28%) showed high level of adherence. (Figure 2).

![Figure 2: Hypertension medication among respondents](http://ugspace.ug.edu.gh)
4.4 Patient related factors among respondents

This section presents patient related factors which respondents perceived as influencing their level of adherence to high blood pressure medication. Approximately half of the respondents 173 (49.4%) reported that they sometimes forget to take their medication when they are busy at home and more than half (53.4%) reported that they forget to take their medication when they are at home. Less than half of the respondents 165 (47.1%) worry about long term use of the medications while more than half 185 (52.9%) reported that they do not have anyone to remind them to take their medications. Most respondents 204 (58.3%) reported that they stopped using their medications when they experienced any side effect. A large proportion of the respondents, 218 (62.3%) reported that the cost of medication deters them from adhering to their medication. A little over half of the respondents 51% believe adherence is affected when the time for taking medication is unfavorable and when they have no need for the drugs. Most respondents 231 (66.0%) and 229 (65.4%) of the respondents reported that presence of family members and presence in public places hampered their adherence to blood pressure medications. Losing sexual performance was reported by 187 (53.4%) of the respondents as affecting their adherence to hypertensive drugs.

More than half of the respondents 203 (58%) reported that their medication adherence was highly influenced by patient related factors while 81 (23%) were mildly influenced (Figure 3).
Figure 3: Level of influence of patient related factors on adherence

4.5 Health facility related factors among respondents

A little over half of the respondents 189 (54.0%) reported that taking more than one medication influences their adherence to high blood pressure medication. More than half of the respondents 185 (52.9%) believe their adherence to medication is influenced by the presence of other medications in addition to their high BP medications influences their level of medication adherence. Most respondents 222 (63.4%) reported that lack of clarity in instruction on medication influences their level of medication adherence. Most respondents 236 (67.4%) reported unclear prescriptions and unavailability of doctors to write new ones influenced their level of medication adherence. Less than half 158 (45.1%) of the respondents reported they were unable to find refills which influenced their medication adherence.
Figure 4 presents level of influence of health facility related factors on respondents’ high blood pressure medication adherence. More than half of the respondents 189 (54%) were highly influenced by health facility related factors while 70 (20%) were mildly influenced.

**Figure 4: Level of influence of health facility related factors on adherence**

4.6 Association between socio-demographic characteristics and medication adherence

The study found significant associations between age (p=0.001); educational level (p=0.001); marital status (p=0.001); type of employment (p=0.001); income level (p=0.001) and high blood pressure medication adherence. High level of adherence was observed among the younger age group 35-44 years; those with tertiary education; married respondents and those with unskilled employment. No association was observed between employment status and duration of condition (p>0.05).
Table 2: Sociodemographic characteristics and high blood pressure medication adherence

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>p-value</th>
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<tr>
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<tr>
<td>45-54</td>
<td>52 (29.5)</td>
<td>22 (29.3)</td>
<td>24 (24.2)</td>
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<td>54 (30.7)</td>
<td>4 (5.3)</td>
<td>16 (16.2)</td>
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<td>above 64</td>
<td>31 (17.6)</td>
<td>17 (22.7)</td>
<td>12 (12.1)</td>
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<tr>
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<td>6 (8.0)</td>
<td>23 (23.2)</td>
<td>66.729</td>
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<tr>
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<td>4 (5.3)</td>
<td>19 (19.2)</td>
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<td>JHS</td>
<td>39 (22.2)</td>
<td>11 (14.7)</td>
<td>3 (3.0)</td>
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<td>22 (22.2)</td>
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<tr>
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<td>32 (32.3)</td>
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</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>85 (48.3)</td>
<td>43 (57.3)</td>
<td>55 (55.6)</td>
<td>5.469</td>
</tr>
<tr>
<td>Single</td>
<td>35 (19.9)</td>
<td>11 (14.7)</td>
<td>19 (19.2)</td>
<td></td>
</tr>
<tr>
<td>Separated/Divorced</td>
<td>17 (9.7)</td>
<td>9 (12.0)</td>
<td>12 (12.1)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>39 (22.2)</td>
<td>12 (16.0)</td>
<td>13 (13.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>114 (64.8)</td>
<td>49 (65.3)</td>
<td>70 (70.7)</td>
<td>1.068</td>
</tr>
<tr>
<td>Unemployed</td>
<td>62 (35.2)</td>
<td>26 (34.7)</td>
<td>29 (29.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Employment status</strong> (spouse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>75 (42.6)</td>
<td>43 (57.3)</td>
<td>47 (47.5)</td>
<td>4.995</td>
</tr>
<tr>
<td>Unemployed</td>
<td>11 (6.3)</td>
<td>3 (4.0)</td>
<td>4 (4.0)</td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>90 (51.1)</td>
<td>29 (38.7)</td>
<td>48 (48.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Type of employment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled</td>
<td>71 (40.3)</td>
<td>37 (49.3)</td>
<td>23 (23.2)</td>
<td>60.657</td>
</tr>
<tr>
<td>Unskilled</td>
<td>56 (31.8)</td>
<td>26 (34.7)</td>
<td>74 (74.7)</td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>49 (27.8)</td>
<td>12 (16.0)</td>
<td>2 (2.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Income level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-500</td>
<td>28 (15.9)</td>
<td>19 (25.3)</td>
<td>19 (19.2)</td>
<td>60.095</td>
</tr>
<tr>
<td>501-1000</td>
<td>15 (8.5)</td>
<td>18 (24.0)</td>
<td>39 (39.4)</td>
<td></td>
</tr>
<tr>
<td>1001-1500</td>
<td>53 (30.1)</td>
<td>22 (29.3)</td>
<td>24 (24.2)</td>
<td></td>
</tr>
<tr>
<td>&gt; 1500</td>
<td>57 (32.4)</td>
<td>15 (20.0)</td>
<td>17 (17.2)</td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>23 (13.1)</td>
<td>1 (1.3)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Duration of condition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>65 (36.9)</td>
<td>29 (38.7)</td>
<td>31 (31.3)</td>
<td>6.187</td>
</tr>
<tr>
<td>4-6</td>
<td>37 (21.0)</td>
<td>22 (29.3)</td>
<td>29 (29.3)</td>
<td></td>
</tr>
<tr>
<td>7-9</td>
<td>24 (13.6)</td>
<td>11 (14.7)</td>
<td>16 (16.2)</td>
<td></td>
</tr>
<tr>
<td>&gt; 9</td>
<td>50 (28.4)</td>
<td>13 (17.3)</td>
<td>23 (23.2)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 5%
4.7 Association between patient related factors and high blood pressure medication adherence

The study observed significant association between level of influence of patient related factors and medication adherence (p=0.001). Higher influence of patient related factors was related to lower level of BP medication adherence (Table 3).

<table>
<thead>
<tr>
<th>Patient related factors</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly</td>
<td>158</td>
<td>32 (42.7)</td>
<td>14 (14.1)</td>
<td>162.061</td>
</tr>
<tr>
<td>Moderately</td>
<td>12 (6.8)</td>
<td>21 (28.0)</td>
<td>34 (34.3)</td>
<td></td>
</tr>
<tr>
<td>Mildly</td>
<td>6 (3.4)</td>
<td>22 (29.3)</td>
<td>51 (51.5)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 5%

4.8 Association between Facility related factors and high blood pressure medication adherence

Table 4 presents association of health-related factors and level of medication adherence. Significant association was observed between health-related factors and level of medication adherence (p=0.001). Higher BP medication adherence was observed among those who were mildly influenced by health-related factors.

<table>
<thead>
<tr>
<th>Health related factors</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly</td>
<td>149 (84.7)</td>
<td>12 (16.0)</td>
<td>26 (26.3)</td>
<td>151.512</td>
</tr>
<tr>
<td>Moderately</td>
<td>25 (14.2)</td>
<td>34 (45.3)</td>
<td>33 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Mildly</td>
<td>2 (1.1)</td>
<td>29 (38.7)</td>
<td>40 (40.4)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 5%
5.1 Introduction

This section discusses the results of the study. The results are discussed in relation to reviewed literature on medication adherence and factors influencing medication adherence. The study sought to answer the following research questions: What is the level of adherence of patients to antihypertensive medications at Ridge Hospital; What are the patient related factors associated with adherence to antihypertensive medications at Ridge Hospital? What are the health facility related factors associated with adherence to antihypertensive medications?

5.2 Demographic characteristics

The ages of the patients were fairly distributed across the various age groups. A higher proportion of the respondents were in age group 35-44 and 45-54 years. About 94% of the respondents were 35 or more years. This age distribution reflects the onset of hypertension among the Ghanaian population. This used to cap at 40 years and above. However, in recent times the disease condition affect a much younger age group (Laryea, 2013).

About half of the respondents had tertiary education while only 10% had no formal education. This educational level could be attributed to the urban setting of the study site (Ridge Hospital) and perhaps suggest that hypertension affects people of higher socioeconomic status thus mimicking western life styles (Laryea, 2013).

More than half of the respondents in the study were married. This is explained by the age groups of respondents. Being married has implication for adherence to medication as have
been shown in some studies. Married individual showed higher adherence 65% compared with single 45%. Married partners provide social support to each other and sometimes serve as reminders to medication adherence (Laryea, 2013).

Most of the respondents in this study were employed. This may be attributed to the level of education observed in this study. Income levels of respondents in this study were distributed fairly across the various levels of income.

5.3 Medication Adherence

The Morisky Medication Adherence Scale 8 questionnaire was used, to determine level of adherence of respondents to hypertension medication. This tool has been widely used and accepted globally as effective in determining medication adherence for various health conditions. A patient’s capability to follow treatment plans to achieve results is frequently compromised by many barriers which could be patient-related, socio-economic, health care team and related systems, condition-related and therapy related (WHO 2003). In this study, two-thirds of the respondents reported forgetting to take their hypertension medication sometimes. Due to work pressure, stress and financial constraints, some respondents sometimes forget to take their medications. Others too are overwhelmed with taking more than one drug several times during the day and this may lead to forgetting to take them. This is emphasized by the fact that half of the respondents reported missing their medication in the last two weeks. Vrijens et al., (2008) also stated that on any one day, hypertensive patients omit approximately 10% of the prescribed doses of hypertensive medications.

Respondents in this study cut down on their medication intake anytime they felt worse without reporting to their doctor or pharmacist. This behavior leads to medication non-
adherence and uncontrolled hypertension (Turki & Sulaiman, 2010). In this study, almost half of the respondents reported that they sometimes forget to take their medication when they travel. Travels to funerals, work related and religious related travels require that individuals leave home early to get to their destination on time. The timing is usually different from the usual time they take their medication. This may lead to them forgetting completely or taking the drugs at a different time. Turki & Sulaiman, 2010), reported in their study that approximately half of the patients forget to take their medications. There is a growing body of evidence that persons who do not take medications as prescribed for cardiovascular disease suffer adverse health outcomes (Krousel-Wood et al., 2005; Khalil & Elzubier, 1997).

A large proportion also reported that they stopped taking their medication when they felt better. This may be due the lack of understanding of hypertension being a chronic disease condition. Patients treat it as other curable diseases and therefore assume it is cured when they start feeling better. This is also because taking the medication everyday inconvenience them as reported by most them. Despite these behaviours among respondents, the majority of them reported that they took their medication yesterday. The rate of adherence in this study is lower than similar studies conducted in Ghana which showed that 93% of the patients did not comply with their medications and 96% of the non-adherent patients cited unaffordable drug prices as the main reason for non-adherence (Buabeng et al., 2004; Jamedu, 2006; Kretchy, 2014; Laryea, 2013). Only 51% of Americans treated for hypertension are adherent to their long-term therapy (CDC, 2013). In a related study by Bilal et al., (2015) conducted in India, 64.1% of the patients did not adhere to their hypertension medication. Contrary to the findings of this study, lower non-adherence rates have been reported elsewhere. Tomaszewski et al., (2014) reported a lower rate of 25% of
non-adherence to hypertensive medications. In Nigeria, Akintunde & Akintunde (2015) using 114 hypertensive subjects and employing the Morisky 8 questionnaire observed a non-adherence rate of 36.8%, low 23.9% and medium of 39.5%. A similar study conducted in Soudi Arabia by Ghobain et al., (2016) reported a lower rate of 12.3%.

5.4 Patient related factors among respondents

This study investigated the role of patient related factors on respondents’ level of medication adherence. Patients reported forgetfulness as influencing their adherence to hypertension medication when they are at home or busy. In order to curb this, respondents must have reminders such as their partners or children to enable them to adhere to their medication. Long term use of medication among respondents influences their ability to adhere to their medications. Most respondents are used to taking medication for at most a week and then the disease condition is treated. In the case of hypertension, they usually forget or lack the understanding that the disease can only be managed and the medication must be taken for the rest of their lives. Briesacher et al., (2008), reported that adherence proportions during the first year of therapy across a range of chronic medical conditions are usually treated with conservation therapy.

More than half of the respondents also reported that they do not have anyone to remind them to take their medications. Retired, widowed and divorced individuals usually live alone and as such do not have partners to remind them to take their medication (Khalil & Elzubier, 1997). In such situations, other methods such as electronic reminders can be encouraged. Claxton et al., (2001) add that electronic monitoring studies show that even chronically sick patients who regularly make refills of their prescriptions take only half of their doses. Briesacher et al., (2009), also showed that the average adherence for the patient who take
their medication only once a day constitute approximately 80% in comparison to about 50% for those patients who have to take medications four times a day. Pan et al., (2008) informed that several studies have proved that medication adherence increase by almost 13% if patients take a fixed-dose combination of two diabetes medicines in comparison to those who take two separate diabetes medicines.

A large proportion of the respondents reported that they are influenced by the high cost of hypertension medication. This is more evident among respondents with low income and educational level. High cost of medication sometimes make respondents to buy part of the medication with the hope of buying the rest when they have access to more money. They often do not get the money and their medication intake is interrupted until they get more money. Time at which medication is taken was reported to affect respondents’ medication adherence (Aziz and Ibrahim, 1999). When the timing of the medication intake is unfavorable to respondents, it becomes more difficult for them to adhere to medication. There are cultural and religious beliefs about chronic diseases and most Ghanaians keep their hypertension status from friends and family. Fear of being asked why they are taking their medication prevents them from doing so when such individuals are with them (Aziz and Ibrahim, 1999).

5.5 Health facility related factors among respondents

The study also investigated the role of health facility factors on medication adherence among respondents. In this study, taking more than one medication was a course of worry among respondents as more than half reported that it influenced their adherence rate. Taking more than one medication and for several times during the day inconvenience respondents. It also increases the probability of them forgetting to take them (Krousel-Wood et al., 2009).
Others reported that experiencing side effects such as dizziness and tiredness after taking medication influences their level of adherence. Educating respondents on such side effects can help them to manage them. Like the findings of this study, Gimenes, Zanetti, & Haas (2009) have shown that patients often discontinue their medications or even do not take them at all because they consider them ineffective or experience undesirable side effects. Also, Conlin et al., (2001) showed that patients who report that they have side effects are 3.5 times less likely to be adherent to medication. On the contrary, hypertensive patients who do not feel any side effects have significantly better adherence for over a four-year period.

Having additional medications from comorbid conditions such as diabetes makes it more difficult for patients to adhere to their hypertension medication (Osterberg et.al, 2005). This may be because of different dosage and time for taking these medications which may sometimes be confusing. Clarity in instructions given to patients on medication also influences their adherence. Respondents are shy to ask for clarification on instructions for fear of being insulted (Osterberg et.al, 2005). Health personnel have also reported that due to the large numbers of patients they do not have adequate time to carefully explain these instructions to patients (Osterberg et.al, 2005).

Mukora-Mutseyekwa and Chadambuka (2011) reported that the level of information provided to patients may also impact on the level of adherence to medications. Most respondents reported unclear prescriptions and unavailability of doctors to write new ones and this influenced their level of medication adherence. Illegible prescriptions result in return of prescriptions for clarification. Most often, it is difficult to locate the same doctor and colleagues are also reluctant to write new ones. According to Akintunde and
Akintunde, (2001), in Africa, medication adherence is related to many factors. These include patient history, demographic characteristics, health related factors and facility related factors.

Less than half of the respondents were unable to find refills and this influenced their medication adherence. Depending on where respondents resided, they sometimes had difficulty in finding refills unless they go back to their health facility (Osterberg et.al, 2005). In view of this, more than half of the respondents were highly influenced by health facility related factors. Significant associations were found between health facility related factors and respondents’ medication adherence. Scientists mention different reason of poor adherence such as poor communications between healthcare providers and patients, fear of side effects, high medication costs, interaction with other prescriptions, and simple forgetfulness (National Council on Patient Information and Education, 2013).

Other factors identified in this study as influencing medication adherence were respondents age, educational level, marital status, employment type and income level. Similar studies from Duah et al., (2013), Cooper et al., (2005), and Laryea (2013) have reported that patient’s literacy or level of education, the extend of the disease and treatment regimen as well as patient beliefs and illness perceptions are perceived by some researchers to affect adherence to antihypertensive regime. Munger et al., (2007) believe that such aspects as female gender, younger age, higher education, higher socioeconomic status, and fewer antihypertensive drugs are related to higher rates of medication adherence.
CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study has shown that hypertensive patients attending Ridge Hospital have low adherence rate with patient and health related factors adversely affecting adherence. In addition, factors such as age, sex, educational level, employment type and income level were also associated with medication adherence.

6.2 Recommendation

The findings of the study make provisions for the following recommendation:

1. The authorities at Ridge hospital must intensify health education on benefits of hypertensive medications.

2. The various hospitals in Accra Metropolis in collaboration with The Health Promotion Unit of Ghana Health Service must have policies to ensure regular health education on adherence to hypertensive clinics in their outpatient departments and hypertensive clinics.

3. The hospitals in Accra Metropolis in collaboration with The Health Promotion Unit of Ghana Health Service must ensure that detailed information on hypertensive medication telecast on television and aired on radio stations to increase the coverage of health education.

4. The Ghana Health Service must design and implement policies to improve on patient and health related facility to reduce their negative influence on hypertensive medication non-adherence.

5. Pharmacy departments at Hospitals in collaboration with The Health Promotion Unit of Ghana Health Service must identify innovative ways such as electronic reminders to improve on patient adherence to hypertensive medication.
6. Further studies should be done using qualitative techniques to understand the factors influencing non-adherence to antihypertensive medications.
REFERENCES


APPENDIX: QUESTIONNAIRE

FACTORS ASSOCIATED WITH ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS AMONG PATIENTS ATTENDING RIDGE HOSPITAL

This study seeks to assess factors associated with adherence to antihypertensive medications among patients attending Ridge Hospital. Please you are kindly requested to fill this questionnaire, and any information provided would be treated purely confidential. However, findings will be used to improve service provided to all patients.

Section A: Demographic Characteristics

1. Age in years ............
2. Education: No formal education [ ] Primary [ ] JHS [ ] SHS [ ] Tertiary [ ]
3. Marital status: Married [ ] Single [ ] Separated/divorced [ ] Widowed [ ]
4. Employment: Employed [ ] Unemployed [ ]
5. Spouse employment: Employed [ ] Unemployed [ ]
6. Type of employment: Skilled [ ] Unskilled [ ]
7. Income level: 1-500 [ ] 501-1000 [ ] 1001-1500 [ ] > 1500 [ ]
8. Duration of condition: 1-3 years [ ] 4-6 years [ ] 7-9 years [ ] > 9 years [ ]

Section B: Medication adherence (Morisky 8)

9. Did you ever forget to take your medication? Yes [ ] No [ ]
10. Are you careless at times about taking your medication? Yes [ ] No [ ]
11. When you feel better, do you sometimes stop taking the medication? Yes [ ] No [ ]
12. Sometimes, when you feel worse, do you stop taking your medication? Yes [ ] No [ ]

Section C: Patient related factors

13. When you are busy at home. Yes [ ] No [ ]
14. When you are at work. Yes [ ] No [ ]
15. When there is no one to remind you. Yes [ ] No [ ]
16. When you worry about taking them for the rest of your life. Yes [ ] No [ ]
17. When they cause some side effects. Yes [ ] No [ ]
18. When they cost a lot of money. Yes [ ] No [ ]
19. When you come home late from work. Yes [ ] No [ ]
20. When you do not have any symptoms. Yes [ ] No [ ]
21. When you are with family members. Yes [ ] No [ ]
22. When you are in a public place. Yes [ ] No [ ]
23. When you are afraid of becoming dependent on them. Yes [ ] No [ ]
24. When you are afraid they may affect your sexual performance. Yes [ ] No [ ]
25. When the time to take them is between your meals. Yes [ ] No [ ]
26. When you feel you do not need them. Yes [ ] No [ ]
27. When you are traveling. Yes [ ] No [ ]

**Health Facility related factors**

28. When you take them more than once a day. Yes [ ] No [ ]
29. If they sometimes make you dizzy. Yes [ ] No [ ]
30. If they sometimes make you tired. Yes [ ] No [ ]
31. When you have other medications to take. Yes [ ] No [ ]
32. Lack of clarity on medication from health personnel Yes [ ] No [ ]
33. Unable to get refills for medication when i run out. Yes [ ] No [ ]
34. Prescriptions are not clear and no doctor to give one. Yes [ ] No [ ]

**THANK YOU**