SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

ASSESSMENT OF HYPERTENSIVE PATIENT-RELATED FACTORS INFLUENCING ADHERENCE TO ANTI-HYPERTENSIVE MEDICATION AT COCOA CLINIC IN THE KANESHI SUBURB OF GREATER ACCRA

BY

CHRISTINA ASIEDUA

(10636763)

THIS DISSERTATION IS SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE MASTERS IN PUBLIC HEALTH (MPH) DEGREE

JULY, 2018

DECLARATION

I, Christina Asiedua hereby declare that except for references of other people's work which has been duly acknowledged, this dissertation entitled "Assessment of hypertension patient-related factors influencing adherence to anti-hypertensive medication at Cocoa clinic" submitted to School of Public health, University of Ghana is a record of an original work done by me under the guidance of my supervisor.

I further declare that the work has not been submitted and will never be submitted either in whole or part for the award of any degree elsewhere.

NAME OF STUDENT : CHRISTINA ASIEDUA

SIGNATURE : ……..

DATE :

NAME OF SUPERVISOR: DR ERNEST KENU

SIGNATURE : …….

DATE :

Department Of Epidemiology and Disease Control, School of Public Health, College Of Health Sciences, University Of Ghana, Legon

DEDICATION

I humbly dedicate this work to God and parents Mr. Michael Adu and Mrs. Agartha Adu.

ACKNOWLEDGEMENT

I am grateful to the almighty God for His faithfulness and love.

I wish to express my gratitude to Dr. Ernest Kenu my academic supervisor for his expert, sincere and valuable guidance and encouragement. My sincere gratitude goes to my family for their immense consideration, support, prayers and thoughtfulness during this period. May God bless you abundantly.

To all the Doctors and Nurses at Cocoa clinic OPD and the staff at the Pharmacy, I am grateful for your support.

And lastly to my fellow course mates, thanks for the team support exhibited, the inspirational group discussions, and for making this course exciting over this one-year period.

ABSTRACT

BACKGROUND

Hypertension is a chronic condition that requires long term management to avoid complications. It is a growing public health concern. Adherence to medication therapy has been identified as a major problem in people with chronic conditions although there are several evidence to show effectiveness of medication. A worldwide non adherence to medication among chronic patients is estimated to be 50% and this is not different in Ghana. Non adherence again leads suboptimal therapy and uncontrolled blood pressure.

Hypertension morbidity and mortality has consistently increased at Cocoa clinic as a result of uncontrolled blood which can be caused by low or non adherence to therapy. This study determined the factors associated with adherence to medication among adults receiving care at Cocoa clinic.

Method: A cross- sectional study was conducted among adult hypertensive patients receiving care at the Cocoa Clinic from 29 to 84 years. A structured questionnaire was used to collect data. Adherence was assessed using the eight-item Morisky Medication Adherence scale (MMAS-8). Data was analyzed using STATA software version 15. Multiple regression model was used to identify patients' factors associated with adherence.

Results: Overall adherence was 43.2%, (121/280) participants have poor adherence. Gender (OR=2.5; 95%CI=1.09-5.74), ability to afford medication (OR = 8.00; 95%CI =2.73-23.47), co-morbidity (OR=3.65; 95%CI=1.53-8.72) and locus of control (OR= 0.16; 95%CI=0.073-0.35) were significantly associated with adherence.

Conclusion: At Cocoa clinic, females are more adherent than males, people who are able to buy their medication are more likely to adhere to their medication. Similarly, patients who believe they are responsible for their health are more likely to stick to their treatment plan. Hypertensive patients who had no other condition aside hypertension were more adherent. There is therefore the need for anti-hypertensive medication to be subsidized and patients empowered to be the sole keepers of their health.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BP : Blood Pressure

DSP : Diastolic Blood Pressure

ENT : Ear, Nose and Throat

HKLS : Hypertension Knowledge Level Scale

MHLC : Multidimensional Health Locus of Control

NHIS : National Health Insurance Scheme

OPD : Out Patient's Department

SBP : Systolic Blood Pressure

WHO : World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Hypertension is a chronic disease and common health problem that has serious medical and economic consequence. It is also known as high blood pressure. The world prevalence of hypertension among adults was estimated to be approximately 40% in 2008 (Boima et al., 2015). Likewise, in sub Saharan Africa, hypertension is a common condition with an estimation of 16.25% as at 2008 with a projection that about 125.5 million would be affected by 2025 (Twagirumukiza et al., 2011). The case is, however, not different in Ghana as according to Bosu (2010), the prevalence of hypertension in the urban areas ranges from 25.5% to 48% and 19% to 32.8% in the rural areas.

In Ghana, reported evidence shows that hypertension is placed second on the causes of morbidity in outpatients aged 45 years and older (Addo et al., 2012). High blood pressure as defined by the eighth report of the Joint Nation Committee, is a blood pressure of ≥ 140 /90 millimeters of mercury (mmHg) and one of the conditions which leads to renal malfunctioning, stroke, myocardial infarction and death if not diagnosed early for treatment. Nevertheless, raised blood pressure is a more preventable contributor to disease and deaths when individuals are placed on the right antihypertensive medications to improve their health consequences and possibly provide a better way of life (Beckett et al., 2008).

Adherence to a long term therapy as per the World Health Organisation (WHO) definition is "the degree to which a person's ability of sticking to treatment plan, changing diet and lifestyle remodeling relates to recommendations from a health professional (De Geest & Sabaté, 2003). Similarly the patient together with the physician adopt suitable techniques to better the patient's

health by incorporating the physician's view and patients lifestyles for optimum care. The issue of medication non adherence is a global concern as it primarily determines the treatment outcomes and so non adherence is a serious concern affecting not only the patient but healthcare systems at large (Jimmy & Jose, 2011). Extensive research shows that adherence to hypertension medication worldwide is 50% (De Geest & Sabaté, 2003) where as in Ghana, non-adherence to anti-hypertensive medication according to Buabeng and colleagues is 93% (Buabeng, Matowe, & Plange-Rhule, 2004).

Adherence to medication regimen is especially important for the management of chronic disease including heart disease and hypertension as it leads to desired clinical outcomes. Failure to adherence is a growing health concern which attenuates quality of life, increases disease progression and increase health expenditures (Jimmy & Jose, 2011). The ability of adhering to multiple medications in patients with chronic disease especially cardiovascular disease is a difficult task which when not achieved leads to uncontrolled blood pressure and thus sub optimal care in disease management (Abegaz, Shehab, Gebreyohannes, Bhagavathula, & Elnour, 2017).

Hypertension continues to remain among the top ten diseases claiming the lives of Ghanaians with its crippling complications marring the quality of life of people who have been diagnosed with it. The Ghana Health Service revealed that almost 50% of Ghanaian adults are hypertensive with 70% not knowing their status; thus the name the 'silent killer' because many may have it for years without realizing it and it slowly damages the brain, heart, kidneys and eyes. Furthermore hypertension and its related complications are responsible for almost 70 % of deaths in hospitals and main cause of stroke and deaths at the Komfo Anokye Teaching Hospital in the Ashanti region (Agyemang et al., 2012).

The extent of poor adherence to medication regimen cannot be overlooked knowing how it significantly leads to undesired treatment outcomes, reduces quality of life, causes medical complications and waste health care resources. Hence involving the patient in treatment process and helping them take their medications assiduously to avoid higher risk of severe complications, reduce hospitalisation and generally improve the quality of life.

1.2 PROBLEM STATEMENT

Non-adherence to medication therapy is an increasing concern associated with poor treatment success and uncontrolled blood pressure (Abegaz et al., 2017). The World Health Organisation (WHO) estimates that about 50% of medication non adherence is found among chronic illness patients and about 25% of patients treated for hypertension do not achieve optimum blood pressure control as a result of non adherence to pharmacotherapy (De Geest & Sabaté, 2003). The case is no different in Ghana as report shows that 66.7% of hypertensive patients adhere to their hypertension medication (Boima et al., 2015).

Medication non adherence is linked to an interplay of factors which specifically include poor knowledge about the drug and its use, the side effects of the medications, long term drug regimen and burden of taking numerous medication, cost and access to medication, poor patient- provider communication and not being convinced of the need for treatment (Jimmy & Jose, 2011).

Non adherence to hypertensive medication gives rise to hypertension complications which causes about 9.4 million deaths each year. Recently it was discovered that, deaths as a result of heart diseases are about 45% whereas deaths resulting from stroke approximates 51% (IFPMA, 2016). It also has a negative impact on health systems, family, patient and nation as a whole. Most of

these complications come with frequent hospitalizations which disables patients financially, reduces their income thus making them a burden on the family and society at large. Similarly when these patients are hospitalized, man hours are lost as family members rotate in turns to cater for them. Likewise, their quality of life is reduced as complications such as stroke leads to paralysis of the body impeding mobility and thus leads to depression. The health care system suffers similar fates as it takes more work force and materials to cater for patients with complications. This drains the finances of health care facilities thereby reducing their efficiency in terms of medications and human resource. Though adherence is attributed to a lot of factors, it is difficult to measure as it is more of an individual patient behavior (Brown & Bussell, 2011).

There is therefore the need to improve adherence in order to prevent complications and reduce the negative impact on health systems, family and the patient. This study therefore seeks to assess hypertensive patient-related factors influencing adherence at Cocoa Clinic in order to make interventions so as to improve upon their adherence to medication therapy.

1.3 GENERAL OBJECTIVE

To assess the hypertensive patients' factors and its relationship with adherence.

1.3.1 SPECIFIC OBJECTIVES

1. To determine the proportion of hypertensive patients with comprehensive knowledge about their medication and condition as well as their beliefs that influence adherence
2. To determine the socio-economic factors of hypertensive patients that affect adherence.
3. To determine the proportion of hypertensive patients with co-morbidities and how that affect adherence to anti-hypertensive therapy.

1.4 THE CONCEPTUAL FRAMEWORK

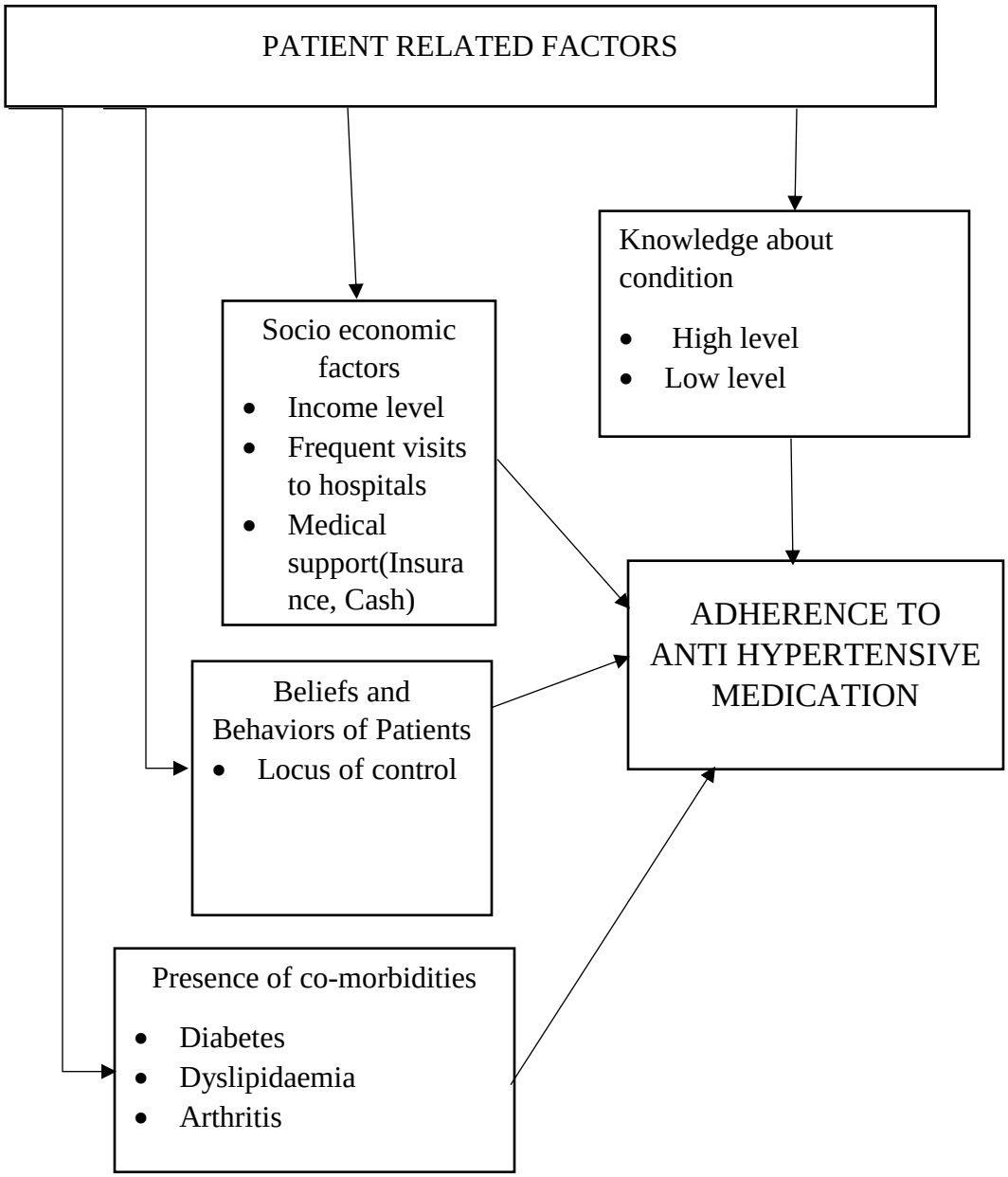

Figure 1.1 A Conceptual framework showing the Patient related factors affecting adherence

Adherence is affected by an interplay of individual factors ranging from knowledge about condition, socio economic factors, certain beliefs and behaviors of patients and presence of co-morbidities. Knowledge about condition and medication directly impacts on adherence as well as the socio economic status of the individual. Presence of other illness leads to poly pharmacy that is a combination of different medication which can increase risk of adverse reaction (side effect) thus leading to non adherence to therapy. Certain beliefs patients have about medication particularly concerning side effects as well as behaviors such as forgetfulness directly affect adherence to pharmacotherapy.

1.5 JUSTIFICATION

Complications associated with hypertension is on the rise and one of the key reason is uncontrolled high blood pressure. This has led to an increase in hospitalizations, progression of disease and deaths. These increase in complications and death is as a result of patients not adhering to their prescribed medication.

Majority of Ghanaians are enjoying quality health care through private insurance, the National health insurance scheme and are getting most of their prescribed medication through it. However, there are still some individual factors that impede adherence to prescribed medication causing non adherence to therapy to be on the rise.

This study seeks to identify patient-related factors influencing adherence. One interesting factor that will be investigated is the relationship between knowledge patients have about their condition and adherence. The findings from this study would help provide necessary information to policy makers on burden and factors that influence non adherence to medication among hypertensive patients. The recommendation from the study would go a long way to improve adherence if implemented.

CHAPTER TWO

LITERATURE REVIEW

2.1 HYPERTENSION

Hypertension also known as high blood pressure (BP) is when there is a sustained elevated systolic blood pressure (SBP) of 130mmHg and a diastolic blood pressure (DSP) of 80mmHg (Pk et al., 2017). One is diagnosed of having high blood pressure when there is consistent elevated levels of both systolic and diastolic BP. According to the Seventh report of the Joint National Committee (JNC), hypertension is said to be normal with a systolic BP of 120mmHg and a diastolic BP of 80mmHg. However, in people with diabetes a high blood pressure is defined as a BP in excess of 130/80mmHg (Pk et al., 2017)

Table 2.1 A table showing classification of blood pressure

Category	**SBP** **mmHg**	**DSP** **mmHg**
Normal	< 120	and < 80
Pre - hypertension	120 – 129	< 80
Hypertension Stage 1	130 – 139	or 80 – 89
Hypertension Stage 2	>=140	>=90
Diabetics	130	80

(Whelton Pk et al., 2017)

The systolic and diastolic BP measurements show the various grades of hypertension. However pre hypertension stage is not a disease category but a check to show that individuals are at a high risk of developing hypertension hence changes in lifestyle can help reduce risk and subsequently prevent disease in the future.

Generally, there are two forms of hypertension namely; Primary hypertension and Secondary hypertension. Primary hypertension is the very popular form of the disease and occurs in about 90 – 95% of individuals. It is sometimes called essential hypertension. There is no known cause of primary hypertension however probable causes include genetic and environmental factors. The Secondary hypertension, on the other hand, arises as a consequence of another medical disorder or drug treatment. Secondary hypertension occurs in fewer people of about 10% (Siyad, 2011).

2.2 CAUSES OF HYPERTENSION

Several conditions are known to cause hypertension. Some of which include;

- Atherosclerosis
- Coarctation of the aorta
- Cushion syndrome
- Hyperaldosteronism
- Acromegaly
- Thyroid disease

Drug induced Hypertension

- Adrenal steroid hormones
- Cocaine, amphetamines, other illicit drugs

- Cyclosporin and tacrolimus
- Erythropoetin
- Inadequate doses of medications
- Liquorice
- Nonsteroidal anti-inflammatory drugs

Lifestyle related

- Obesity
- Excessive alcohol intake
- Stressful lifestyle (Aram V. Chobanian et al., 2003)

2.3 ETIOLOGY OF HYPERTENSION

Hypertension, even though most likely to occur secondary to other diseases, can also be a condition of unknown origin. A history of hypertension in the family increases tendency of a person to develop hypertension. Essential hypertension occurs more frequently in blacks up to about four times than in whites. It usually frequent among people in their middle age. Other causes including stressful lifestyles, high intake of salt, obesity, and smoking are high risk indicators of the occurrence of the disease (Siyad, 2011).

2.4 EPIDEMIOLOGY OF HYPERTENSION

Universal deaths were projected to increase in 2008 by the World Health Statistics (WHS 2012). A projection of 57 million worldwide deaths of which 63% were attributed to non communicable diseases (NCDs). Among the deaths caused by NCDs, the largest proportion which is 48% is attributed to cardiovascular disease (JAPI, 2013). Similarly yearly deaths from hypertension were projected to be 7.5 million with a prevalence in adults of about 40% (Lin AB et al., 2011). Reported

evidence showed that systolic blood pressures decrease by 1mmHg per decade from 1980 through to 2008 (Lin AB et al., 2011).

Hypertension occurrence, however, in Africa continues to be relatively higher with rapid rise in population, population age progression, rising urbanization, bulk migration to urban areas from rural settings, adoption of foreign cultures such as alcohol and smoking (Adeloye & Basquill, 2014). Epidemiological surveys depicts that hypertension occurrence has increased in both urban and rural area with a current percentage of 25 in the urban areas and a range of 10-15% in the rural areas (JAPI, 2013). Cardiovascular diseases which are responsible for one third of all deaths around the world can be controlled by optimizing blood pressure control and thus reducing the incidence of mortalities (Chobanian et al., 2003).

2.5 RISK FACTORS OF HYPERTENSION

Several risk factors have been thought to contribute to elevated blood pressures. Alcohol consumption is a known risk factor of hypertension and cardiovascular disease in general as it is associated with both hemorrhagic and ischemic stroke. Current studies suggest advantages of alcohol intake on coronary artery disease, ischemic stroke, and peripheral arterial disease and even known to lower the risk of congenital heart failure (Djoussé & Mukamal, 2009). Despite these seeming benefits of alcohol consumption, there have been studies to show that taking alcohol more than two or three times a day increases the probability of developing hypertension substantially and increases ones chances of developing hypertension up to 75% (Factsheet, 2010). Factsheet 2010 continues to elaborate that the excessive consumption of alcohol positively escalates the possibility of developing hypertension and other cardiovascular disease. The trend of alcohol intake in men and women differ as evidence shows that women are not to exceed three units per

day and four units in men as it significantly raises systolic blood pressure by 2mmHg on the average (Stranges et al., 2004).

Cigarette smoking is an influential risk factor of cardiovascular diseases and its cessation independently prevents a larger number of cardiovascular diseases (Virdis, 2010). Smoking in general causes a rise in blood pressure by causing an increase in peripheral vascular resistance, narrowing arteries and ultimately causing damage of the artery walls. Nicotine found in cigarette acts as adrenergic agonist stimulating the sympathetic nervous system thereby exerting a hypertensive effect (Primatesta, 2001).

Age and family history of hypertension have also been known to increase risk of hypertension. According to National Institute of Health, people whose close relatives develop hypertension before 60 years suggests there is twice the risk of developing hypertension. Similarly, age also plays a role in hypertension. Ageing comes with a decrease in the strength of the arteries causing an in increase in systolic pressure generated with each heart beat and thereby causing systolic blood pressure to rise with a converse decrease in diastolic pressure (Alexander , 2011).

Lifestyle factors are key determinants of elevated blood pressure. Excess body fat coupled with other dietary measures such as high salt intake, excess alcohol consumption and sedentary lifestyle are predominant causes of hypertension (Beilin, 2017). Further elaboration by Beilin et al suggests that physical inactivity leads to accumulation of fat especially central obesity which results in insulin insensitivity, glucose intolerance and dyslipidemia which leads to increase risk of cardiovascular disease.

2.6 MANAGEMENT OF HYPERTENSION

Management of hypertension involves both pharmacological and non-pharmacological treatment.

2.6.1 NON PHARMACOLOGICAL MANAGEMENT

Non pharmacological management of hypertension primarily involves lifestyle modification. Hypertension management requires change in way of living as it is very essential in the prevention of the disease. Reported evidence shows that lifestyle modification such as regular exercise, healthy diets, relaxation therapies, cessation of smoking, reduction of alcohol consumption and low intake of salts significantly reduced the risk of hypertension (NICE, 2011).

2.6.2 PHARMACOLOGICAL MANAGEMENT

Pharmacological management involves the use of drugs in the controlling of elevated blood pressure. Commonly used oral antihypertensive drugs are:

- Alpha-adrenoceptor blocking drugs
- Angiotensin-converting enzyme inhibitors
- Angiotensin- II receptor antagonists
- Beta-adrenoceptor blocking drugs
- Calcium-channel blockers
- Centrally acting drugs
- Diuretics
- Vasodilators

2.7 ADHERENCE

Medication adherence is the degree to which people stick to treatment plan, modify their lifestyle, change diet which agrees with recommendations from medical personnel (De Geest & Sabaté, 2003). The tern adherence is often used interchangeably with the word compliance. Compliance suggests that the patient submissively follows the health care providers' opinion and the treatment plan does not involve the patient's opinions and ideas. Conversely adherence is the existence of treatment alliance between the healthcare provider and the patient. Here the patient is involved in the treatment plan and hence abide by orders and recommendations from a doctor.

2.8 FACTORS INFLUENCING ADHERENCE

Largely, the ability to comply with drug treatment is an effective way of cutting down cost and likewise the incidence of complications and the need for additional medications (De Geest & Sabaté, 2003). Non-adherence plays an essential role in the failure of antihypertensive therapy (Ho, Bryson, & Rumsfeld, 2009).

A study done by (Alsolami, Correa-Velez, & Hou, 2015) on factors influencing non adherence to antihypertensive therapy suggests that non adherence is buttressed by an interplay of reasons which include forgetting to take medications, missing some doses, medication side effects, pill burden, poor counselling, cost issues. These factors can be categorized into aspects relating to the patient, factors related to health institution, not forgetting social and economic factors.

The emergence of anti-hypertensive medication has shown immense efficacy in reducing high BP and subsequently episodes of cardiovascular conditions (Chobanian et al., 2003).

Furthermore, the benefits derived from antihypertensive medication can significantly diminish by poor adherence. Poor adherence can be unintentional (such as forgetting) or can be deliberate

whereby people resolve to forsake treatment because of their staunch ideologies they have about their illness and treatment (Gosmanova & Kovesdy, 2015).

2.8.1 KNOWLEDGE ON DISEASE AND TREATMENT

Several interventions to address adherence are geared towards education. Poor level of knowledge on disease, treatment and complication affect adherence to medication. If patients with chronic conditions do not know that their condition cannot be cured but can only be managed, then patients would stop taking their medications once they feel better. Therefore educating patients on their condition and the importance of taking their medications assiduously improve adherence and subsequently improves quality of life. A study conducted to show the influence of knowledge on disease and adherence showed that patients who knew the names of the medications and complications of hypertension reported better adherence to their hypertensive medication (Olowe & Ross, 2017).

2.8.2 SOCIO-ECONOMIC FACTORS

2.8.2.1 INCOME LEVEL

The income level of patients determines their ability to afford prescribed medication. Management of hypertension is expensive ranging from medications, hospital procedures, biomedical analysis and imaging examinations. A study conducted to determine the level of adherence in people with different income levels showed that people with higher income level showed better rate of adherence since they reported that they could afford their medications prescribed by the doctor and they were not burdened buying their medication (Tong, Chu, Fang, Wall, & Ayala, 2016).

2.8.2.2 FREQUENT VISITS TO HOSPITAL

Frequents visits to the hospital is another way of improving medication adherence. Frequent visits to the hospital is affected by proximity of health facility to the patient, transportation to the health facility and poverty. Patients who visit the hospital frequently on monthly basis are more likely to be adherent as they receive their medications timely (Ambaw, Alemie, Yohannes, & Mengesha, 2012).

2.8.2.3 MEDICAL SUPPORT

Management of hypertension is expensive. Medical health insurance is a surest way of ensuring people are not burdened with medical issues as the insurance caters for their medical bills which include consultation, medications and others (Jeong et al., 2017). Having an insurance cater for medications is proper way of improving adherence since patients will not be burdened by buying their medications and going for reviews. Likewise adherence was seen to be higher in patients who had medical insurance as compared to those with no medical insurance

2.8.3 BELIEFS

The locus of control of people refers to the perception people have about their health. People who believe they are responsible for their health are said to have internal locus of control whereas people who believe other people such as health care providers specifically doctors are responsible for their health and as such they are to consult them for issues concerning their health are said to have external (other people) locus of control. Similarly, people who believe their being healthy is as result of chance or luck are said to have external (chances) locus of control (Kretchy, Owusu-Daaku, & Danquah, 2014). In another study, it was observed that people with internal locus of

control showed better level of adherence because they believe their actions and behaviour greatly influence their health (Omeje & Nebo, 2011).

2.8.4 PRESENCE OF CO-MORBIDITY

Presence of co-morbidity in a way is a deterrent to adherence. Pill burden and poly pharmacy are associated with co-morbidity as medicines needed to take by patients increase and deter the patient from taking their medication or ceasing to take medications when they feel better. In a study by Mekonnen on the effect of co-morbidity on adherence showed that patients with no co-morbidity had better adherence and likewise as the presence of other disease with hypertension increase, adherence decreased (Saadat et al., 2015).

2.8.4.1 DIABETES AND ADHERENCE

Other studies have shown that patients with diabetes have shown a good level of adherence to anti-hypertensive medication and not only to their anti-diabetic medication and as such have attained a good control of their blood pressure (Natarajan, Putnam, Van Aarsen, Lawson, & Burge, 2013). Diabetics are made to understand that having a good control of BP will positively impact on their glucose level and vice versa.

2.8.4.2 ARTHRITIS AND ADHERENCE

Adherence in patients with arthritis have not been encouraging as per studies conducted by (Marengo & Suarez-Almazor, 2015). Most patients with arthritis are old and are affected by other ailments such as dementia. Also people with arthritis are in constant pain and are likely not to adhere to their anti-hypertensive medication due to the pain they experience.

2.8.4.3 DYSLIPIDEMIA AND ADHERENCE

Concomitant use of anti-hypertensive medication with dyslipidemia medication has been shown to significantly reduce adherence (Herttua, 2016). This could be attributed to the fact that most of these dyslipidemia medications given to anti-hypertensive medications are for prophylaxis and not indicated for any condition. This makes patients feel reluctant taking these medications which in effect affect their overall adherence to anti-hypertensive medication.

2.9 MEASUREMENT OF ADHERENCE

According to (Lam & Fresco, 2015) several researchers have tried to measure drug adherence but none of them can be said to be the best way of measuring adherence.

Direct methods of measuring adherence are one of the ways of measuring adherence in patients. Directly observing therapy is a technique of ensuring adherence as patients are made to take their medication in the presence of a health practitioner. Likewise measuring concentration of drugs in blood or urine and sometimes the metabolites of the drug in urine helps to detect patients taking their medications. However, these approaches are expensive as they require a lot of resources in ascertaining adherence. Aside being expensive, they are worrisome to health care providers and also to patients. Sometimes patients are not able to follow through these sequence of direct methods of measuring adherence. Indirect methods of measuring adherence revolves around the patient. Indirect methods seek to find about the difficulty patients experience in taking their medications, reconciling their pills against those not taken, and determining the rate at which prescriptions are refilled. These methods involves interrogating the patient and evaluating their clinical outcomes.

Indirect methods used to measure adherence are comparatively easy to use nevertheless directly asking patients could be susceptible to misrepresentation and this may overestimate or underestimate patient adherence (Lam & Fresco, 2015).

2.10 LITERATURE SUMMARY

Hypertension, also known as the silent killer, is currently a global health problem causing untimely death globally. Annually approximately 8 million people die and the problem is growing. Hypertension in males are higher than females in all regions. Rapid urbanization and ageing populations are contributors to this increase in prevalence of high blood pressure in urban areas. Many people remain undiagnosed and miss out on treatments that can significantly reduce their risk of death and heart diseases and those that get diagnosed are not adhering to their anti-hypertensive therapy.

Adherence to medication is affected be a number of factors which could be people not understanding fully their condition and what to do about it, people do not know that the medications are to control their blood pressure and hence have to be on it for life, often the side effects of these medication deter people from adhering to the therapy, people also attribute their inability to comply to their medications to cost associated with these medications and sometime unavailability of these medications.

Numerous private health insurances have come up to support people with their medical bills and help them frequent health facilities to stay healthy and longer. But the question still remains; how many people are able to patronize these private health insurances? The other insurance offered by government, does it takes care all their needs? Assuming these insurances do, then why are people still not adhering to their medications? Could it be that people are forgetting to take their

medications? Or are still bring burdened with the side effects of their medications? Or people still do not think they are responsible for their health?

There is therefore the need to understand the factors related to the patient that prevents them from adhering to their therapy and determine possible ways of helping people adhere to their medication.

CHAPTER THREE

METHODS

3.1 STUDY TYPE

A cross- sectional study was conducted at Cocoa clinic among adult hypertensive patients attending hypertensive clinic from 11th June to 29th June 2018.

3.2 STUDY LOCATION

Cocoa Clinic is a quasi-government institution which was founded in 1973 as a small office clinic to provide medical treatment to staff and dependents of the Ghana Cocoa Board and its subsidiaries. The Cocoa Clinic is located in the heart of Kaneshi a suburb of Accra. It provides medical services to communities within Kaneshi, Bubuashie, and other surrounding communities. Over the years, the various departments of the clinic have blossomed into a full-fledged medical facility providing medical services to over 100 cooperate bodies, private individuals and health insurance scheme clients.

Other services include specialist care pediatrics, Ear, Nose and Throat (ENT), Surgery and Internal medicines and Radiology.

The area of study was selected because hypertension is recorded as one of the top ten diseases of the clinic and has a high patient's attendance and variety of hypertensive patients also attend the clinic.

3.3 STUDY POPULATION

The study population includes all confirmed adult hypertensive patients of the hospital reporting to the out-patient department (OPD) of the Clinic. These patients should have been on the medication for not less than one year.

3.3.1 INCLUSION CRITERIA

- Known hypertensive patients aged 18 years and older
- Patients diagnosed of hypertension and have been on medication for at least one year
- Patients with diagnosis of hypertension with or without co- existing medical conditions
- Patients willing to participate in the study

3.3.2 EXCLUSION CRITERIA

- Patients who are hypertensive but on admission
- Hypertensive patients who cannot be interviewed e.g. severely ill patients
- Patients who are unwilling to participate in the study

3.4 STUDY VARIABLES

3.4.1 DEPENDENT VARIABLE

Adherence to anti-hypertensive medication

3.4.2 INDEPENDENT VARIABLES

The individual that were investigated were grouped into:

- Socio demographic factors
    1. Sex
    2. Age
    3. Educational status
    4. Religion
    5. Marital status
    6. Occupation
- Socio-economic factors
    1. Marital Status
    2. Mode of Payment
    3. Educational level
    4. Occupation
    5. Monthly income
    6. Burdened by purchasing medication
    7. Ability to afford medication
    8. Reviews

- Locus of control
    1. Internal
    2. External (other people)
    3. External (chances)
- Knowledge about hypertension
- Co-morbidity

3.5 SAMPLING

3.5.1 SAMPLE SIZE CALCULATION

Sample size was calculated using the Cochran, (1963) for cross sectional study

$n = [Z^2 p (1-p)]/d^2$ …….. (1)

Where n: estimated minimum sample size

Z: z value for chosen p value

p: estimated proportion

q: 1-p

d: margin of error on p

Assumptions

1. At 95% confidence interval Z=1.96
2. p = estimated level of non-adherence among hypertensive patients estimated to be 79% (Khan et al., 2014)
3. q = 1-p
4. d = 0.05

D: margin of error is 5%.

d= 0.05

Inputting the above into equation (1), the minimum sample size required for this study is given by

$n= [(1.96)^2 \times 0.79 (1- 0.79)] / (0.05)^2$

n= [3.842 x 0.79(0.21)]/0.0025 = 254

A 10% non- response proportion is assumed and estimated to be $N = 254 \times 0.1 = 25.4$. This is therefore added to the sample size initially calculated;

The minimum sample size = 254 + 25.4= 279.4

Hence 280 patients would be required for the study

3.5.2 SAMPLING PROCEDURE

From the sample size calculation, the total number of people needed for the study was 280. Hypertension clinic at the Cocoa clinic is on every Wednesday. It was difficult to determine the sample frame for hypertensive patients receiving care at Cocoa clinic before the start of the study. Therefore as participants came to the nurses' station to check their vitals, their folders were cross examined to determine when they were diagnosed of hypertension, their age, presence or absence of any co-morbidity. Participants whose details fell within the inclusion criteria were recruited for the study. Participants were therefore recruited for the study as they came in to check their vitals based on the inclusion criteria. Selected patients were interviewed as they queued to see the doctor or after consultation with the doctor. Each day an average of 31 respondents were obtained.

Prior to the interview, participants were given a consent form to read and sign. Consent forms were read to participants who could not read and write. Each questionnaire took about 8- 10 minutes on the average to be completed. A period of two weeks was used to fully collect data through interviewing participants based on a structured questionnaire. Data collection started from 11th June – 29th June from 7am to 5pm excluding weekends. Patients were interviewed until exhausted at the clinic.

3.6 DATA COLLECTION TECHNIQUES/METHODS &TOOLS

Data collection was done using a well-structured questionnaire. The questionnaire was divided into five sections based on the interest of the study. The first part of the questionnaire captured information on demographic factors such as sex, age, marital status, occupation. The second section of the questionnaire was used to determine the level of knowledge about hypertension, treatment, and complications. Knowledge was graded as high knowledge and low knowledge based on a score that was obtained on a modified Hypertension Knowledge Level Scale (HK-LS). The third section also assessed the socioeconomic state of the participant as to how their income level affect their visits to the hospital and their mode of payment for medication. The Multidimensional Health Locus of Control (MHLC) was used to evaluate the locus of control of participants concerning their health condition, what influences their ability to seek health; whether they believe in their ability to influence their health or feel an outer force such as chance, fate, or other people are responsible for their health. The Morisky 8-Item Adherence Measurement Scale, (2008) was used to measure adherence. The responses was a Yes with score of 0 or No with a score of 1 to seven questions. The last question which has a 5- point Likert option: (A) Never/Rarely (B) Once in a while (C) Sometimes (D) Usually (E) All the time had a score of 1 if the answer was A and a score of 0 if the answer was B to E. The total scores was summed up to create an overall adherence score ranging from 0 – 8, a score of more than 6 as high adherence and below 6 as low adherence.

3.7 DATA PROCESSING

At the end of every data collection day, questionnaire was examined for completeness and accuracy. The data were entered into excel and imported in Stata version 15.

3.8 DATA ANALYSIS

3.8.1 STATISTICAL METHODS

The data were analyzed using Stata version 15. The data were entered and coded into Excel. Socio-demographic characteristics and other variables were computed for frequencies and descriptive statistics. The frequencies and descriptive statistics were presented in a table form. The association between adherence and variables was analyzed by cross tabulation, and their significances were tested by chi square.

P values obtained from contingency table which were less than 0.05 were entered into multiple logistic regression model. Multiple logistic regression was performed to determine the influence of knowledge about hypertension, socio-economic factors, locus of control and presence of any co-morbidity on adherence to anti-hypertensive medication.

The adjusted odds ratio (AOR) and 95% Confidence level (CI) were performed to determine factors associated with anti-hypertensive medication and a p value of 0.05 or less was considered statistically significant.

3.9 ETHICS

The study was carried out at the Cocoa Clinic. Ethical approval was sought from the Ghana Health

Service Ethics Review Committee with approval-ID GHS-ERC: 62/01/18. Permission was sought in writing from the Medical Director of Cocoa Clinic and the OPD manager was briefed on the objectives of the study before the start of the study.

The participants were told about the objectives of the study in English, Twi and Ga. They were assured of no potential harm as well as of confidentiality of the data collected. Study participants were told of their freedom to decline participation, with no consequences should they decide to do so. Subjects were asked to read and sign forms that show they have consented to being participants of this study. Those who were not able to sign were asked to thumb print. Consent forms were explained to participants who cannot read so they can understand it before deciding to sign or thumb print.

The completed questionnaire were under lock in a cabinet with the researcher being the only one with access. The electronic data set from the desk review was deleted from the computer and the external memory device used as back up. Questionnaires used for the questionnaire guided interviews will be incinerated after 5 years.

I the principal investigator declare no conflict of interest in this study.

3.10 PRETEST AND PILOT

The questionnaires were piloted at Faith evangelical mission church and 15 anti-hypertensive patients were used. Questions were identified to be unclear were modified.

During the pretesting, time allocations for answering each questionnaire and procedures were checked.

CHAPTER FOUR

RESULTS

A total of 280 hypertensive patients participated in the study. These are presented as follows:

4.1 BACKGROUND CHARISTERISTIC OF PARTICIPANTS

The total number of participants recruited for the study is 280. Out of this, 56.79% (159/280) were males. The age ranges were 29-39 years 23.21% (65/280), 40-49 year 26.43% (74/280), and 20% (56/280) for both ages 50-59 and 60-69, 70 years and above 10.36% (29/280). The minimum age was 29 years and a maximum age of 84 years with a mean age of 51.5 years and standard deviation of (SD±12.8). Most of the hypertensive patients 82.50% (231/280) were Christians and 17.50% (49/280) were Muslims. Similarly, 72.14% majority of the hypertensive patents (202/280) were married, 19.29% (54/280) with few participants cohabiting 1.43% (4/280). For educational level, 43.57% (122/280) of the participants were reported to have secondary education and 10% (28/280) had no formal education. The occupational status of the hypertensive patients were also assessed with 43.57% (122/280) being traders and artisans. Majority of the participants were NHIS holders 47.14% (132/280) and cocoa board subsidiaries 37.86% (106/280). For co-morbidity 52.50% (147/280) had other conditions aside hypertension.

Table 4.1: Socio-demographic characteristics of hypertensive patients at Cocoa Clinic

Variable name	Frequency N=280 (%)
Age	
29-39	65 (23.2)
40-49	74 (26.4)
50-59	56 (20.0)
60-69	56 (20.0)
70+	29 (10.4)
Sex	
Male	159 (56.8)
Female	121 (43.2)
Religion	
Christian	231 (82.5)
Muslim	49 (17.5)
Marital status	
Single	54 (19.3)
Married	202 (72.1)
Divorced	12 (4.3)
Co-habiting	4 (1.4)
Separated	8 (2.9)
Educational Level	
No formal education	28 (10.0)
Primary	40 (14.3)
Secondary	122 (43.6)
Tertiary	90 (32.1)
Occupation	
Unemployed	34 (12.1)
Trader/Artisan	122 (43.6)
Professional	69 (24.6)
Retired	48 (17.1)
Others	7 (2.5)
Mode of Payment	
Cocobod Subsidiary	106 (37.9)
Private health plan	25 (8.9)
NHIS	132 (47.1)
Cash	17 (6.0)
Co-morbidity	
Yes	147 (52.5)
No	133 (47.5)
Total	**280 (100.0)**

Source: field survey, 2018

4.2 KNOWLEDGE OF PARTICIPANTS ABOUNT CONDITION AND TREATMENT

The knowledge of the participants about the condition and treatment was assessed. Out of the total number of 280 participants, 77.14% (216/280) had high knowledge about hypertension, its treatment and complications. From table 4.2, males reported to have a high knowledge of hypertension 80.50% (128/216) compared with females. Knowledge about hypertension across the various age group showed 29-39 years 86.1% (56/65) reported to have the highest knowledge about hypertension 86.15% (56/65). Knowledge was analyzed by marital status and it was observed that level of knowledge about hypertension was least among co-habiting participants 0.93% (2/216). The knowledge of participants with different educational background showed that participants with tertiary as the highest level of education reported to have the highest level of knowledge 92.22% (83/90).

Table 4.2: Participants level of knowledge about hypertension

Characteristic	Frequency (%)
High knowledge	216 (77.1)
Low Knowledge	64 (22.9)
Total	280 (100.0)

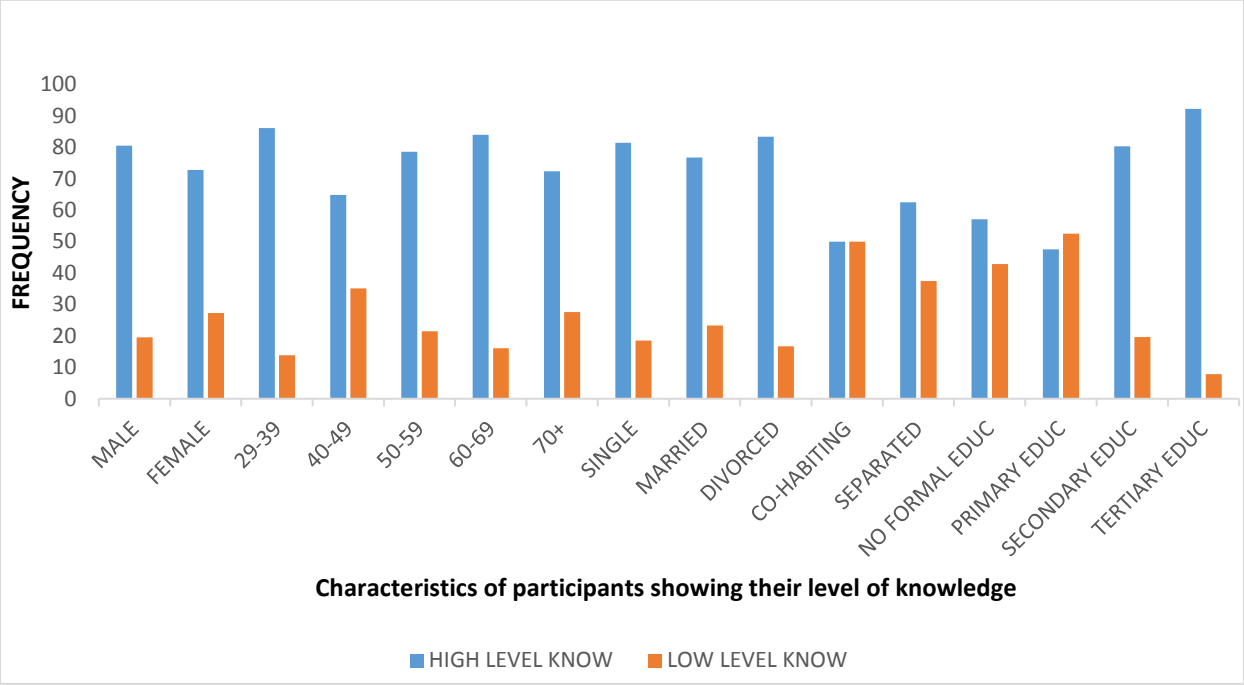

Figure 2: Distribution of participants' knowledge on hypertension, treatment and complication

4.3 SOCIO-ECONOMIC CHARACTERISTIC OF PARTICIPANTS

Most of the hypertensive patients who were part of the study were married 72.1% (202/280). Participants who had NHIS paying for their consultation and drugs as well as those who have theirs paid by Cocoa board were reported to be highest with 47.1% (132/280) and 37.9% (106/280) respectively. Educational level of participants showed that 10.0% (28/280) had no formal education with 12.1% (34/280) being unemployed. 36.8% (103/280) of the participants enjoy a monthly income of more than GH₵1000 with 50% of respondents getting all prescribed medications on their health plan be it private insurance, NHIS, Cocoa board subsidiary or cash clients. Participants who did not feel burdened to purchase prescribed medication not obtained on their health plan and those who bought all prescribed medication not obtained on their health plan were 57.9% (162/280) and 63.2% (177/280) respectively. 97.5% (115/118) of participants who felt burdened to purchase prescribed medications and 82.4% (84/102) of participants who could not purchase their medications attributed their inability to financial constraints. Majority of the hypertensive patients 58.6% (164/280) had a three month review schedule.

Table 4.3a: Socio-economic characteristic of participants

Characteristic	Frequency (%)
Marital status	
Single	54 (19.3)
Married	202 (72.1)
Divorced	12 (4.3)
Co-habiting	4 (1.4)
Separated	8 (2.9)
Mode of payment	
Cocoa board subsidiary	106 (37.9)
Private health plan	25 (8.9)
NHIS	132 (47.1)
Cash	17 (6.0)
Educational level	
No formal education	28 (10.0)
Primary	40 (14.3)
Secondary	122 (43.6)
Tertiary	90 (32.1)
Occupation	
Unemployed	34 (12.1)
Trader/ Artisan	122 (43.6)
Professional	69 (34.6)
Retired	48 (17.1)
Others	7 (2.5)
Monthly Income	
Less than GH₵200	29 (10.4)
GH₵200- GH₵600	69 (24.6)
GH₵600-GH₵1000	79 (28.2)
More than GH₵1000	103 (36.8)
Med. Insurance	
Yes	140 (50.0)
No	140 (50.0)
Burdened	
Yes	118 (42.1)
No	162 (57.9)
Buy all med	
Yes	177 (63.2)
No	103 (36.8)

Source: Field Survey, 2018

Table 4.3b: Socio-economic characteristic of participants

Characteristic	Frequency (%)
Burdened Reason	
Lack of funds	115 (97.5)
Buy all meds Reason	
Lack of funds	84 (82.4)
Forgetfulness	18 (17.7)
Review	
Monthly	96 (34.3)
Every 3months	164 (58.6)
Every 6months	15 (5.4)
Yearly	5 (1.8)
Total	**280 (100.0)**

Source: Field Survey, 2018

4.4 PARTICIPANTS LOCUS OF CONTROL

Beliefs of the participants regarding their health (locus of control) as to who they feel is responsible for their health were assessed. These beliefs were grouped as internal, external (other people) and external (chances). It was observed that majority of the participants, 53.2% (149/280) were found to be in charge of their own health (internal) and thus believe they are responsible for being healthy and staying health with few of the participants 7.9% (22/280) believing that luck and chance has a part to play in their wellbeing (Figure 3).

The locus of control of the participants was compared with the age, gender, marital status, educational level, occupation, and religion. Age group 60-69 showed to have a strong perception 66% (37/56) that they are in charge of their own health and such being healthy depends largely on their actions and behaviors. Female participants 43% (52/121) did not really believe that their being healthy solely depended on their behaviors instead they believe that their ability to go for medical check-ups and adhering to doctors' advice make them healthy. Likewise participants with no formal education 60.7% (17/28) shared similar perception as the female participants about who they feel is responsible for their health.

Hypertensive patients who were unemployed 50% (17/34) believe that they being healthy is a clear indication of their own action and behaviors and not due to chance or luck. Christians 53.3% (123/231) have high internal locus of control with 6.9% (16/231) having external (chance) locus of control. Divorced participants 58.3% (7/12) also showed a high internal locus of control which implies that they are in charge of their own health (Table 4.4)

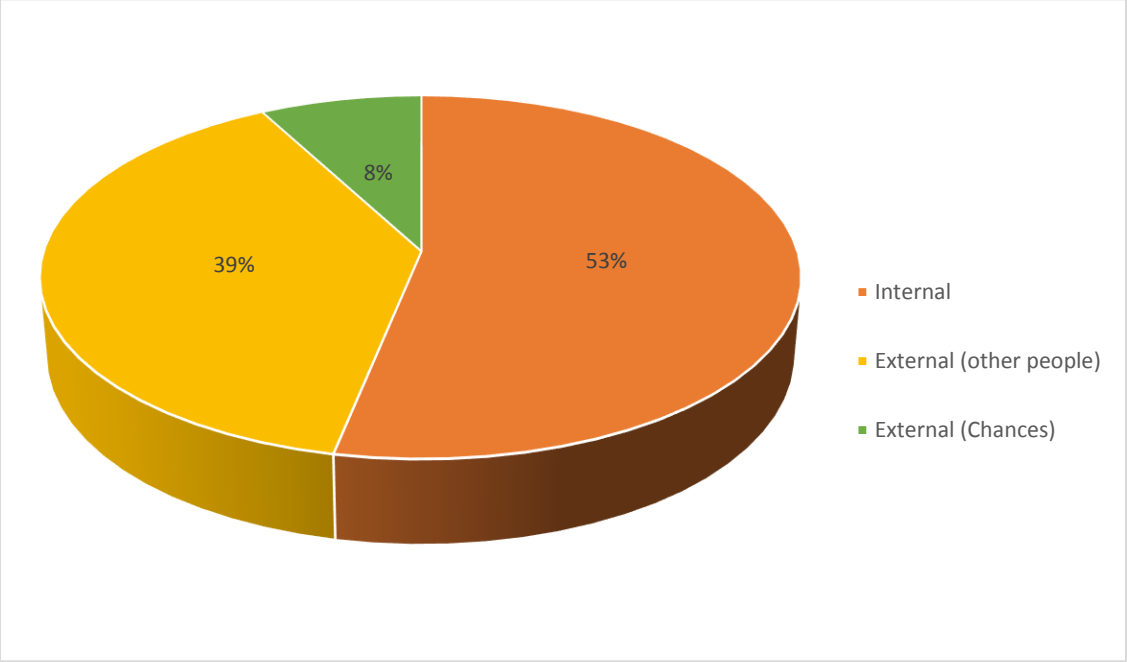

Figure 3: Locus of control of participants

Table 4.4: Demographic characteristics locus of control

Characteristic	Frequency (%)		
	Internal	External (other people)	External (chances)
Age			
29-39	31 (47.7)	28 (43.0)	6 (9.2)
40-49	40 (54.0)	28 (37.8)	6 (8.1)
50-59	25 (44.6)	30 (55.6)	1 (1.8)
60-69	37 (66.0)	14 (25.0)	5 (8.9)
70+	16 (55.1)	9 (31.0)	4 (13.8)
Gender			
Male	88 (55.3)	57 (35.9)	14 (8.8)
Female	61 (50.4)	52 (43.0)	8 (6.6)
Marital status			
Single	24 (44.4)	21 (38.9)	9 (16.7)
Married	121(55.5)	79 (39.1)	11 (5.5)
Divorced	7 (58.3)	5 (41.7)	0 (0.0)
Co-habiting	2 (50.0)	2 (50.0)	0 (0.0)
Separated	4 (50.0)	2 (25.0)	2 (25.0)
Religion			
Christian	123(53.2)	92 (39.8)	16 (6.9)
Muslim	26 (53.0)	17 (34.7)	6 (12.2)
Educational level			
No formal education	11 (39.3)	17 (60.7)	0 (0.0)
Primary	17 (42.5)	20 (50.0)	3 (7.5)
Secondary	72 (59.0)	39 (32.0)	11 (9.0)
Tertiary	49 (54.4)	33 (36.7)	8 (8.9)
Occupation			
Unemployed	17 (50.0)	13 (38.2)	4 (11.8)
Trader/Artisan	58 (47.5)	51 (41.8)	13 (10.7)
Professional	43 (62.3)	26 (37.7)	0 (0.0)
Retired	31 (64.6)	14 (29.2)	3 (6.3)
Others	0 (0.0)	5 (71.4)	2 (28.57)
Total	**149 (53.2)**	**109 (39.0)**	**22 (7.8)**

Source: Field Survey, 2018

4.5 PARTICIPANTS WITH CO-MORBIDITY

From table 4.5, majority of the participants reported to have other conditions such as diabetes, dyslipidemia and arthritis aside hypertension. 52.50% (147/280) participants had other conditions aside hypertension. Hypertensive patients who also had diabetes were reported to have the highest frequency 70.74% (104/147) where hypertensive patients with arthritis reported to be the lowest 26.5% (39/147).

Table 4.5: Proportion of participants having co-morbidity

Characteristic	Frequency, (%)
Co-morbidity	
Yes	147 (52.50)
No	133 (47.50)
Type of Co-morbidity	
Diabetes	140 (95.24)
Dyslipidemia	66 (44.89)
Arthritis	39 (26.53)
Total	**147 (100.00)**

Source: Field Survey, 2018

4.6 DETERMINING THE LEVEL OF ADHERENCE

The level of adherence was assessed using the eight item- Morisky Medication Adherence Scale (MMAS-8). The MMAS-8 has an adherence score of 0-8. Participants who had a score of 6 and below were classified to have poor adherence. The minimum score was 0 and the maximum score was 8. From the classification, 57% (159/280) had good adherence to whilst 43% (121/280) of the participants had poor adherence (Table 4.6)

Table 4.6: Participants Adherence level

Characteristic	Frequency (%)
Adherence	
Adherent	159 (57.0)
Non- adherent	121 (43.0)
Total	**280 (100.0)**

Source: Field Survey, 2018

4.7 PARTICIPANTS SOCIO DEMOGRAPHIC CHARACTERISTICS AND ADHERENCE

According to table 4.7, males reported to have a high adherence rate as compared to female participants. Adherence among the participants who were 70 years and above were found to be more adherent to their medication while adherence level among ages 50-59 being the least. This difference was however not significant. Christian participants reported a better adherence level. Married participants showed a better adherence level as compared with divorced participants. The difference in adherence across the marital status of the participants was statistically significant.

For educational level, participants who had no formal education and those with primary as their highest form of education showed a high level of low adherence. For occupation status, retired

participants reported excellent adherence level whilst unemployed participants reported the least. Participants who were assessing the facility without any form of health cover showed poor adherence level. As participants' co-morbidity increases, adherence level decreased. From the chi square (X^2), adherence was associated with marital status, occupation status and mode of payment.

Table 4.7: Socio demographic characteristics and adherence

Characteristic	Adherence Good N=121(%)	Poor N=159(%)	p value
Age			0.479
29-39	28 (43.1)	37 (56.9)	
40-49	29 (39.2)	45 (60.8)	
50-59	21 (37.5)	35 (62.5)	
60-69	27 (48.2)	29 (51.8)	
70+	16 (55.2)	13 (44.8)	
Sex			0.863
Male	68 (42.8)	91 (57.2)	
Female	53 (43.8)	68 (56.2)	
Marital Status			0.022
Single	19 (35.2)	35 (64.8)	
Married	98 (48.5)	104 (51.5)	
Divorced	3 (25.0)	9 (75.0)	
Co-habiting	0 (0.0)	4 (100.0)	
Separated	1 (12.5)	7 (87.5)	
Religion			0.965
Christian	100 (43.3)	131 (56.7)	
Muslim	21 (42.9)	28 (57.1)	
Educational level			0.062
No Formal education	6 (21.4)	22 (78.6)	
Primary	15 (37.5)	25 (62.5)	
Secondary	58 (47.5)	64 (52.5)	
Tertiary	42 (46.7)	48 (53.3)	
Occupation			0.007
Unemployed	11 (32.4)	23 (67.6)	
Trader/Artisan	47 (38.5)	75 (61.5)	
Professional	35 (50.7)	34 (49.3)	
Retired	28 (58.3)	20 (41.7)	
Others	0 (0.0)	7 (100.0)	
Mode of payment			0.024
Cocobod subsidiary	58 (54.7)	48 (45.3)	
Private health plan	8 (32.0)	17 (68.0)	
NHIS	49 (37.1)	83 (62.9)	
Cash	6 (35.3)	11 (64.7)	
Co-morbidity			0.182
Yes	58 (39.5)	89 (60.5)	
No	63 (47.4)	70 (52.6)	
Total	**121 (43.2)**	**159 (56.8)**	

*P values obtained from Chi square

4.8 FACTORS INFLUENCING ADHERENCE

Bivariate analysis showed that there is no significant difference in participants with good adherence and poor adherence in age, gender, marital status, religion, occupation, co-morbidity, monthly income, medical insurance, and reviews.

There was, however, a significant difference in the level of adherence of participants in mode of payment, highest educational level, participants who were burdened to buy prescribed medication, patients who could afford prescribed medication, locus of control of participants and their knowledge about hypertension and treatment.

From table 4.8, participants who had medical cover as result of working with Cocoa board, having a private health insurance or their place of work were more likely to be adherent to medication (OR=0.722; 95%CI= 0.57-0.92).Participants who reported to be burdened to buy their medication were less likely to be adherent to medication (OR=0.37; 95%CI=0.23-0.62) together with participants who do not get all their medication under their health plan (OR=1.55; 95%CI=0.96-2.49). Nevertheless, participants who were could afford their prescribed medication were more likely to have high adherence (OR=5.07; 95%CI=2.88-8.91). Again the educational level of participants, their locus of control and knowledge on hypertension and treatment made them more likely to be adherent to their medication [(OR=1.36; 95%CI=1.04-1.72, OR=0.26; 95%CI=0.16-0.41, OR=3.50; 95%CI=1.83-6.71)].

Multivariate logistic regression analysis showed that the locus of control of participants and their ability to afford prescribed medication were significantly associated with good adherence. Adjusting for other significant variables, the odds of a participant with high knowledge level adhering to medication is 1.74 times the odds of a participant with low knowledge level adhering to medication (OR=1.74; 95%CI=0.79-3.93) however this is not significant. Participants who were

burdened by purchasing prescribed medication had a 74% reduction in the odds of adhering to their medication (OR=0.71; 95%CI=0.31-14.47). Again, the odds of participants covered under NHIS adhering to medication is 1.42 times the odds of participants who have private health plan (OR=1.42; 95%CI= 0.70-2.88). Participants who believe that other factors such chance and luck play a part in their being healthy had a 51% reduction in the odds of adhering to medication (OR=0.51; 95%CI=0.11-0.25).

Table 4.8a: Factors influencing Adherence

	Good Adherence	Poor Adherence	Crude OR (95%)CI	P value	Adjusted OR (95%)CI	P value
Age (years)			1.12 (0.93-1.34)	0.233		
Sex						
Male	68 (42.8)	91 (57.2)	Reference			
Female	53 (43.8)	68 (56.2)	1.04 (0.65-1.68)	0.007		
Mode of payment						
Cocobod subsidiary	58 (54.7)	48 (45.3)	Reference			
Private health plan	8 (32.0)	17 (68.0)	0.39 (0.15-0.98)	0.045	0.82 (0.27-2.51)	0.734
NHIS	49 (37.1)	83 (62.9)	0.49 (0.29-0.82)	0.007	1.65 (0.77-3.52)	0.198
Cash	6 (35.3)	11 (64.7)	0.45 (0.15-1.31)	0.144	1.37 (0.31-6.04)	0.681
Marital status						
Single	19 (35.2)	35 (64.8)	Reference			
Married	98 (48.5)	104 (51.5)	1.73 (0.93-3.23)	0.083		
Divorced	3 (25.0)	9 (75.0)	0.61 (0.15-2.54)	0.501		
Co-habiting	0 (0.00)	4 (100.0)	0			
Separated	1 (12.5)	7 (87.5)	0.26 (0.30-2.30)	0.228		
Religion						
Christian	100 (43.3)	131 (56.7)	Reference			
Muslim	21 (42.9)	28 (57.1)	0.98 (0.53-1.83)	0.956		
Educational level						
No formal education	6 (21.4)	22 (78.6)	Reference			
Primary	15 (37.5)	25 (62.5)	2.20 (0.73-6.65)	0.163	2.38 (0.59-9.56)	0.222
Secondary	58 (47.5)	64 (52.5)	3.32 (1.26-8.77)	0.015	2.48 (0.66-9.36)	0.179
Tertiary	42 (46.7)	48 (53.3)	3.21 (1.18-8.66)	0.021	2.14 (0.47-9.75)	0.327
Occupation						
Unemployed	11 (32.4)	23 (67.6)	Reference			
Trader/ Artisan	47 (35.5)	75 (61.5)	1.31 (0.58-2.93)	0.511	0.75 (0.27-2.11)	0.597
Professional	35 (50.7)	34 (49.3)	2.15 (0.91-5.08)	0.080	0.57 (0.15-2.10)	0.402
Retired	28 (58.3)	20 (41.7)	2.92 (1.16-7.34)	0.022	0.89 (0.26-3.12)	0.857
Others	0 (0.00)	7 (100.0)	0			
Co-morbidity						
No	63 (47.4)	70 (52.6)	Reference			
Yes	58 (39.5)	89 (60.5)	0.72 (0.45-1.16)	0.182		

Source: Field survey, 2018

Table 4.8b: Factors influencing adherence

	Good Adherence	Poor Adherence	Crude OR (95%)CI	P value	Adjusted OR (95%)CI	P value
Monthly Income						
Less than GH₵200	8 (27.6)	21 (72.4)	Reference			
GH₵200-GH₵600	29 (42.0)	40 (58.0)	1.90 (0.74-4.89)	0.182		
GH₵600-GH₵1000	34 (43.0)	45 (57.0)	1.98 (0.75-5.01)	0.148		
More than GH₵1000	50 (48.5)	53 (51.5)	2.47 (1.00-6.10)	0.049		
Med. Insurance						
No	53 (37.9)	87 (62.1)	Reference			
Yes	68 (48.6)	72 (51.4)	1.55 (0.96-2.49)	0.071		
Burdened						
No	86 (53.1)	76 (46.9)	Reference			
Yes	35 (29.7)	83 (70.3)	0.37 (0.22-0.62)	< 0.01	0.67 (0.29-1.53)	0.314
Buy all meds						
No	21 (20.4)	82 (79.6)	Reference			
Yes	100 (56.5)	77 (43.5)	5.07 (2.88-8.91)	< 0.01	6.18 (2.51-15.18)	<0.01
Reviews						
Monthly	46 (47.9)	50 (52.1)	Reference			
Every 3months	70 (42.7)	94 (57.3)	0.81 (0.48-1.34)	0.413		
Every 6months	5 (33.3)	10 (66.7)	0.54 (0.17-1.70)	0.297		
Yearly	0 (0.00)	5 (100.0)	0			
Locus of control						
Internal	89 (59.7)	60 (40.3)	Reference			
External (others)	30 (27.5)	79 (72.5)	0.26 (0.15-0.44)	< 0.01	0.23 (0.12-0.44)	<0.01
External (chances)	2 (9.1)	20 (90.9)	0.06 (0.01-0.29)	< 0.01	0.05 (0.01-0.25)	<0.01
Knowledge						
High knowledge	107 (49.5)	109 (50.5)	Reference			
Low knowledge	14 (21.9)	50 (78.1)	3.51 (1.83-6.71)	< 0.01	1.82 (0.80-4.17)	0.155

Source: Field Survey, 2018

CHAPTER FIVE

DISCUSSION

The objective of the study was to find the patient- related factors associated with adherence to anti-hypertensive medication among adult hypertensive patients receiving care at Cocoa clinic.

The findings of the study showed that about 43% (121/280) of the participants had poor adherence to medication. Educational level, occupation of participants, mode of payment of participants, ability to afford medications, not being burdened by purchasing prescribed medication, locus of control and knowledge level of participants were independently associated with good adherence. However, after controlling for other factors and determining association among them, poor adherence was associated with burdened by purchasing prescribed medication and mode of payment of participants.

From the study, the level of adherence to anti-hypertensive medication was 57% (159/280). This adherence level slightly differed from other studies which reported adherence level of 55.9%.

From the study age was not significantly associated with adherence although a good adherence level was seen in participants who were more than 70 years. Participants between ages 40-49 years had the poorest adherence level. This could be attributed to the fact that most people within this age group are in denial and do not feel the need to take medication. Again, people within this age group tend to fear the side effects specifically erectile dysfunction associated with these blood pressure medication thus making them not adhere to treatment. This level of adherence found among patients who are more than 70 years is consistent with a study done in New York city (Bandi, Goldmann, Parikh, Farsi, & Boden-Albala, 2017) which shows that adherence was significant among patients of 70 years. Patients in this age group tend to have caretakers who see

to their general wellbeing and ensure that their medications are taken thus improving adherence. Gender was not found to be significantly associated with adherence, however, males reported a better level of adherence. A similar association between males and adherence has been reported that males are more likely to adhere to their medication than females (Chen, Lee, Liang, & Liao, 2014). This could further be explained that males are in better control over their health and are not affected by emotional stress as it is a major cause of non adherence.

The occupation of participants showed that patients who were unemployed had very low adherence to their medication and this is not different from other studies which also reported income as being directly proportional to adherence (Wariva, January, & Maradzika, 2014). People with low income levels have difficulty obtaining their medication as it may be expensive and cannot afford. Aside medications there are other equally important biomedical analysis and imaging procedure recommended to patients by their doctors. Patients with low income may not be able to afford and this would subsequently reduce adherence. Participants who had a health plan be it private or NHIS, or being a Cocoboard subsidiary showed good adherence to medication. This could be attributed to the fact that the majority of the financial burdens have been lifted of the patient, making them accessible to their medication and thus improving adherence. Respondents who were able to afford prescribed medication were more likely to be adherent to their medication. Therefore when the economic status of people are improved, adherence will be improved because people can now afford their medication and cost of transport to health facilities. Some investigations show that a higher educational level suggests better adherence. However, that finding is not in line with this study. Educational level showed no significant association with adherence. This is similar to other studies which reported that better adherence was not a reflection of participants highest

educational level (Magnabosco et al., 2015). Participants with secondary as the highest form of education rather showed better adherence to their medication.

The perception participants have about their health as to who they believe is responsible for their health and general wellbeing was assessed with adherence. Locus of control is the extent to which people believe they have power over their lives. People with internal locus of control believe that they can influence events and outcomes in their lives where as people with external locus of control blames other people and outside forces for everything concerning their health. Males were reported to have a high internal locus of control and this implies that they seek information concerning their condition which makes them responsible for maintenance and improvement of their physical health. Adherence to medication was better in males as a result of their ability to exercises full power over their health. This study revealed that participants who had an internally oriented locus of control were most likely to adhere to their medication. This is consistent with other findings which shows that people with internal locus of control know more about their condition, and are more likely to take steps that advance and preserve their health (Kretchy et al., 2014).

Knowledge participants have concerning their condition and treatment was evaluated. Knowledge empowers people to make sound choices about their condition and treatment. Knowledge about hypertension improves adherence to medication (Boima et al., 2015). The knowledge among participants concerning hypertension, its treatment and complication was high however adherence was suboptimal. Health education should be reinforced on every visit, pictures could be used to educate patients as patients are able to remember facts about their condition.

The percentage of adherence decreased among patients who had other conditions other than hypertension. Co-morbidity increases the pill burden of hypertensive patients making it stressful for them to stick to their treatment plan (Saadat et al., 2015).

The study had a few limitations. The adherence level obtained from the study could be different from the true adherence level as a self report scale was used. Self report scale is affected by the person's ability to say what actually exist and what they can remember. There is also the likelihood of participants giving socially acceptable answers.

CHAPTER SIX

6.1 CONCLUSION

Adherence to medication was suboptimal. The study revealed that ability to afford medication and having an internal locus of control were significantly associated with good adherence to medication.

There is therefore the need to empower people to have full power over their health and take appropriate steps to improve and maintain their health.

6.2 RECOMMENDATIONS

Cocoa Clinic

- There should be proper projections to ensure availabilities of essential medicines.
- A public health unit can be set up to ensure patients are getting right information concerning their conditions and medicines.
- Again the public health unit can organize health programs for hypertensive patients to empower them on staying healthy and also to offer free screening for them.
- Management should ensure that medicines covered under NHIS are always available so that patients can get all medication.

National

- Taxes on medication should be removed to make medicines more affordable
- Hypertension treatment support should be introduced in the management of hypertension. Family support could be a part of this treatment support so that they will support patients and help them stick to their treatment plan.

REFERNCES

Abegaz, T. M., Shehab, A., Gebreyohannes, E. A., Bhagavathula, A. S., & Elnour, A. A. (2017). Nonadherence to antihypertensive drugs, *4*(June 2016).

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*(2 Suppl), 4–11.

Adeloye, D., & Basquill, C. (2014). Estimating the prevalence and awareness rates of hypertension in Africa: a systematic analysis. *PloS One*, *9*(8), e104300. https://doi.org/10.1371/journal.pone.0104300

Agyemang, C., Attah-Adjepong, G., Owusu-Dabo, E., De-Graft Aikins, A., Addo, J., Edusei, A. K., … Ogedegbe, G. (2012). Stroke in Ashanti region of Ghana. *Ghana Medical Journal*, *46*(2 Suppl), 12–17.

Alexander G, L. (2011). Hypertension in Aging Patients.

Alsolami, F., Correa-Velez, I., & Hou, X.-Y. (2015). Factors Affecting Antihypertensive Medications Adherence among Hypertensive Patients in Saudi Arabia. *American Journal of Medicine and Medical Sciences*, *5*(4), 181–189. https://doi.org/10.5923/j.ajmms.20150504.07

Ambaw, A. D., Alemie, G. A., W/Yohannes, S. M., & Mengesha, Z. B. (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. https://doi.org/10.1186/1471-2458-12-282

Aram V. Chobanian, George L. Bakris, Henry R. Black, William C. Cushman, Lee A. Green, Joseph L. Izzo, … National High Blood Pressure Education Program Coordinating Committee. (2003). SEVENTH REPORT OF THE JOINT NATIONAL COMMITTEE ON PREVENTION, EVALUATION, AND TREATMENT OF HIGH BLOOD PRESSURE.

Bandi, P., Goldmann, E., Parikh, N. S., Farsi, P., & Boden-Albala, B. (2017). Age-Related Differences in Antihypertensive Medication Adherence in Hispanics: A Cross-Sectional Community-Based Survey in New York City, 2011-2012. *Preventing Chronic Disease*, *14*, E57. https://doi.org/10.5888/pcd14.160512

Beckett, N. S., Peters, R., Fletcher, A. E., Staessen, J. A., Liu, L., Dumitrascu, D., … Bulpitt, C. J. (2008). Treatment of Hypertension in Patients 80 Years of Age or Older. *New England Journal of Medicine*, *358*(18), 1887–1898. https://doi.org/10.1056/NEJMoa0801369

Beilin, L. J., Puddey, I. B., & Burke, V. (2017). Lifestyle and hypertension. [Review] [85 refs], *7061*(November), 934–945.

Boima, V., Ademola, A. D., Odusola, A. O., Agyekum, F., Nwafor, C. E., Cole, H., … Tayo, B. O. (2015). Factors Associated with Medication Nonadherence among Hypertensives in Ghana and Nigeria, *2015*.

Brown, M. T., & Bussell, J. K. (2011). Medication adherence: WHO cares? *Mayo Clinic*

Proceedings, *86*(4), 304–314. https://doi.org/10.4065/mcp.2010.0575

Buabeng, K. O., Matowe, L., & Plange-Rhule, J. (2004). Unaffordable drug prices: the major cause of non-compliance with hypertension medication in Ghana. *J Parm Sci*.

Chen, S.-L., Lee, W.-L., Liang, T., & Liao, I.-C. (2014). Factors associated with gender differences in medication adherence: a longitudinal study. *Journal of Advanced Nursing*, *70*(9), 2031–2040. https://doi.org/10.1111/jan.12361

De Geest, S., & Sabaté, E. (2003). Adherence to long-term therapies: Evidence for action. *European Journal of Cardiovascular Nursing*, *2*(4), 323. https://doi.org/10.1016/S1474-5151(03)00091-4

Djoussé, L., & Mukamal, K. J. (2009). Alcohol Consumption and Risk of Hypertension: Does the Type of Beverage or Drinking Pattern Matter? *Revista Española de Cardiología (English Edition)*, *62*(6), 603–605. https://doi.org/10.1016/S1885-5857(09)72223-6

Factsheet. (n.d.). Alcohol and 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. https://doi.org/10.1093/ndt/gfu330

Herttua, K., Martikainen, P., Batty, G. D., & Kivimäki, M. (2016). Poor Adherence to Statin and Antihypertensive Therapies as Risk Factors for Fatal Stroke. *Journal of the American College of Cardiology*, *67*(13), 1507–1515. https://doi.org/10.1016/j.jacc.2016.01.044

Ho, P. M., Bryson, C. L., & Rumsfeld, J. S. (2009). Medication Adherence: Its Importance in Cardiovascular Outcomes. *Circulation*, *119*(23), 3028–3035. https://doi.org/10.1161/CIRCULATIONAHA.108.768986

IFPMA. (2016). HYPERTENSION :, (May).

JAPI. (2013). Epidemiology of Hypertension Global.

Jeong, H., Kim, H., Lee, K., Lee, J. H., Ahn, H. M., Shin, S. A., & Kim, V. (2017). Medical visits, antihypertensive prescriptions and medication adherence among newly diagnosed hypertensive patients in Korea. *Environmental Health and Preventive Medicine*, *22*(1), 10. https://doi.org/10.1186/s12199-017-0619-6

Jimmy, B., & Jose, J. (2011). Patient medication adherence: measures in daily practice. *Oman Medical Journal*, *26*(3), 155–159. https://doi.org/10.5001/omj.2011.38

Khan, M. U., Shah, S., & Hameed, T. (2014). Barriers to and determinants of medication adherence among hypertensive patients attended National Health Service Hospital, Sunderland. *Journal of Pharmacy & Bioallied Sciences*, *6*(2), 104–108. https://doi.org/10.4103/0975-7406.129175

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*(Suppl 1), 13. https://doi.org/10.11694/pamj.supp.2014.17.1.3433

Lam, W. Y., & Fresco, P. (2015). Medication Adherence Measures: An Overview. *BioMed*

Research International, *2015*. https://doi.org/10.1155/2015/217047

Lin AB, J. K., Singh, G. M., Farzadfar, F., Ezzati, M., to, C., Ezzati, M., … Riley, L. 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 5Â·4 million participants. *The Lancet*, *377*(377), 568–577. https://doi.org/10.1016/S0140-6736(10)62036-3

Magnabosco, P., Teraoka, E. C., de Oliveira, E. M., Felipe, E. A., Freitas, D., & Marchi-Alves, L. M. (2015). Comparative analysis of non-adherence to medication treatment for systemic arterial hypertension in urban and rural populations. *Revista Latino-Americana de Enfermagem*, *23*(1), 20–27. https://doi.org/10.1590/0104-1169.0144.2520

Marengo, M. F., & Suarez-Almazor, M. E. (2015). Improving treatment adherence in patients with rheumatoid arthritis: what are the options? *International Journal of Clinical Rheumatology*, *10*(5), 345–356. https://doi.org/10.2217/ijr.15.39

Natarajan, N., Putnam, W., Van Aarsen, K., Beverley Lawson, K., & Burge, F. (2013). Adherence to antihypertensive medications among family practice patients with diabetes mellitus and hypertension. *Canadian Family Physician Medecin de Famille Canadien*, *59*(2), e93–e100. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/23418264

NICE. (2011). Hypertension in adults: diagnosis and Hypertension in adults: diagnosis and management management Y Your responsibility our responsibility.

Olowe, O. A., & Ross, A. J. (2017). Knowledge, adherence and control among patients with hypertension attending a peri-urban primary health care clinic, KwaZulu-Natal. *African Journal of Primary Health Care & Family Medicine*, *9*(1), e1–e7. https://doi.org/10.4102/PHCFM.V9I1.1456

Omeje, O., & Nebo, C. (2011). The influence of locus control on adherence to treatment regimen among hypertensive patients. *Patient Preference and Adherence*, *5*, 141–148. https://doi.org/10.2147/PPA.S15098

Pk, W., Whelton, P. K., Carey, R. M., Aronow, W. S., Ovbiagele, B., Casey, D. E., … Mauri, L. (2017). *2017 ACC / AHA / AAPA / ABC / ACPM / AGS / APhA / ASH / ASPC / NMA / PCNA Guideline for the Prevention , Detection , Evaluation , and Management of High Blood Pressure in Adults A Report of the American College of Cardiology / American Heart Association T*. https://doi.org/10.1161/HYP.0000000000000065/-/DC1.The

Primatesta, P., Falaschetti, E., Gupta, S., Marmot, M. G., & Poulter, N. R. (2001). Evidence From the Health Survey for England. *Hypertension*, *37*, 187–193.

Saadat, Z., Nikdoust, F., Aerab-Sheibani, H., Bahremand, M., Shobeiri, E., Saadat, H., … Morisky, D. E. (2015). Adherence to Antihypertensives in Patients With Comorbid Condition. *Nephro-Urology Monthly*, *7*(4), e29863. https://doi.org/10.5812/numonthly.29863

Siyad, A. . (2011). HYPERTENSION.

Stranges, S., Wu, T., Dorn, J. M., Freudenheim, J. L., Muti, P., Farinaro, E., … Trevisan, M. (2004). Relationship of alcohol drinking pattern to risk of hypertension: A population-based

study. *Hypertension*, *44*(6), 813–819. https://doi.org/10.1161/01.HYP.0000146537.03103.f2

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. *The Journal of Clinical Hypertension*, *18*(9), 892–900. https://doi.org/10.1111/jch.12786

Twagirumukiza, M., De Bacquer, D., Kips, J. G., de Backer, G., Stichele, R. Vander, & Van Bortel, L. M. (2011). Current and projected prevalence of arterial hypertension in sub-Saharan Africa by sex, age and habitat: an estimate from population studies. *Journal of Hypertension*, *29*(7), 1243–1252. https://doi.org/10.1097/HJH.0b013e328346995d

Virdis, A., Giannarelli, C., Neves, M. F., Taddei, S., & Ghiadoni, L. (2010). Cigarette smoking and hypertension. *Current Pharmaceutical Design*, *16*(23), 2518–2525.

Wariva, E., January, J., & Maradzika, J. (2014). Medication adherence among elderly patients with high blood pressure in Gweru, Zimbabwe. *Journal of Public Health in Africa*, *5*(1). https://doi.org/10.4081/jphia.2014.304

APPENDICES

Appendix 1: Informed consent for participation

Research title: Assessment of hypertensive patient- related factors influencing adherence among hypertensive patients at Cocoa clinic.

Introduction

My name is Christina Asiedua, a student from the School of Public Health, College of Health Sciences, University of Ghana, Legon. I am carrying out a study to assess hypertensive patient-related factors influencing adherence to anti-hypertensive medication at Cocoa Clinic. This study seeks to identify factors relating to the patients that do not make them adhere to their anti-hypertensive medication and suggest interventions.

Procedure

The study will involve answering questions about yourself, disease condition and medications. Participation is absolutely voluntary and no coercion would be used to obtain responses from participants. It would be very much appreciated if you could participate in this study. This study is purely academic and forms part of the requirements for the award of a Master degree in Public Health.

Risks and Benefits

This research poses no potential risk to either the study population or the society. There is no direct benefit to you for participation or monetary gain. However, the study is envisaged to be beneficial to both the study population and the society in many ways. The factors that will be identified to help determine areas where health education is to focus. It will help to know what institutional policies need to be in place to advert low level of adherence.

Right to refuse

Participation is this study is voluntary and participants can choose not to answer any particular question or all questions. You are at liberty to withdraw from the study at any time. However, it is encouraged that you participate since your opinion is important in determining the patient-related factors that affect adherence to anti-hypertensive medication.

Anonymity and Confidentiality

You are assured that all information provided will be kept confidential, privacy and will not be shared with anybody who is not part of the study team.

Dissemination of results

A written report will be sent to Cocoa Clinic.

Before taking the consent,

Do you have any questions you wish to ask about the study? Yes [ ] No [ ]

If yes please indicate the question below:

……

……

……

Voluntary Consent

I have read the information provided above, or the information above has been read to me and I understand. I have been given the opportunity to ask questions regarding this study; questions have been answered to my satisfaction. I now voluntarily agree to participate in this study knowing that I have the right to opt out and also withdraw my relative from this study at any time without affecting future health care services.

…… …… ……

Name of participant Signature/Thumprint Date

…… ……. ….…… . ..……..

Name of witness Signature Date

…… ……. ….…… . …… ……..

Name of researcher Signature Date

Interviewer's Statement

I, the undersigned, have explained this consent, to the subject in English language/Twi/Ga, and that he/she understands the purpose of the study, procedures to be followed as well as risks and benefits involved.

The participant has fully agreed to participate in the study.

Interviewer's signature……

Date……

If you have questions later, do not hesitate to contact Christina Asiedua (Tel: 0548203702) or the Administrative Secretary, Ghana Health Service Ethical Review Committee Hannah Frimpong (Tel: 0507041223/0243235225)

Appendix 2: Questionnaire

SUBJECT NO. ……. DATE……

SECTION ONE: SOCIO DEMOGRAPHIC FACTORS

1. Age at last birthday……
2. Sex [1] Male [2] Female
3. Mode of Payment

   [1] Cocobod Subsidiary [2] Private Insurance

   [3] NHIS [4] Cash
4. Marital Status

   [1] Single [2] Married

   [3] Co-habiting [4] Separated

5. Religion

   [1] Christian [3] Traditional

   [2] Muslim [4] Other, specify…….

6. Educational Level

   [1] No formal education [3] Secondary

   [2] Primary [4] Tertiary

7. Occupation

   [1] Unemployed [3] Professional

   [2] Trader/ Artisan [4] Retired

   [5] Other, specify……

8. Any co-morbidity

   1. Yes [ ] 2. No [ ]

9. What are the co-morbidities?

1. Diabetes [ ] 2. Dyslipidaemia [ ] 3. Arthritis [ ]

SECTION TWO: KNOWLEDGE ABOUT DISEASE, TREATMENT AND COMPLICATION

10. A blood pressure reading of 130/80mmHg suggests hypertension

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

11. Elevated blood pressure is called Hypertension

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

12. Hypertension is a curable disease

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

13. The older the person is, the greater their chance of having hypertension

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

14. Both men and women have equal chances of developing hypertension

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

15. Drugs for high blood pressure must be taken everyday

1. Yes [ ] 2. No [ ]

16. Medication is taken only when you feel ill

1. Yes [ ] 2. No [ ]

17. Do you know the names of your high blood pressure medication?

1. Yes [ ] 2. No [ ]

18. Drugs for high blood pressure are taken throughout life time

1. Yes [ ] 2. No [ ]

19. High blood pressure can cause stroke if left untreated

1. Yes [ ] 2. No [ ]

20. High blood pressure can cause heart disease such heart attack if left untreated

1. Yes [ ] 2. No [ ]

21. High blood pressure can cause kidney failure and visual disturbances if left untreated

1. Yes [ ] 2. No [ ]

22. High blood pressure can cause death if left untreated

1. Yes [ ] 2. No [ ]

SECTION THREE: SOCIOECONOMIC FACTORS

23. How much is your monthly income?

[1] Less than GH₵ 200 [2] GH₵200 - GH₵ 600 [3] GH₵ 600 - GH₵ 1000

[4] More than GH₵1000

24. Do you get all your medication from any of the Health Insurance?

1. Yes [ ] 2. No [ ]

25. Do you feel burdened buying your medication?

1. Yes [ ] 2. No [ ]

26. Are you able to buy all your medication?

1. Yes [ ] 2. No [ ]

27. How often do you see your Doctor?

1. Monthly [ ] 2. Every 3 months [ ] 3. Every 6 months [ ]

4. Yearly [ ]

SECTION FOUR: BELIEFS/ BEHAVIOR

Key: Strongly agree [1], Disagree [2], Neither agree or Disagree [3], Agree [4], Strongly Agree [5]

Indicate your level of agreement with each statement by putting a number in the blank by it

INTERNAL

28. If I get sick, it is my own behaviour that determines how soon I get well [ ]

29. I am in control of my health [ ]

30. The main thing that affects my health is what I myself do [ ]

31. If I take care of myself, I can avoid illness [ ]

EXTERNAL (OTHER PEOPLE)

32. Having regular contact with my physician is the best way for me to avoid illness [ ]

33. Whenever I don't feel well, I should consult a medically-trained professional [ ]

34. My family has a lot to do with my becoming sick or staying healthy [ ]

35. Regarding my health, I can only do what my doctor tells me to do [ ]

EXTERNAL (CHANCE)

36. No matter what I do, if I am going to get sick, I will get sick [ ]

37. Luck plays a big part in determining how soon I will recover from an illness [ ]

38. No matter what I do, I'm likely to get sick [ ]

39. If it's meant to be, I will stay healthy [ ]

ADHERENCE SCALE

40. Do you sometimes forget to take your pills?

[0] No [ ] [1] Yes [ ]

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

[0] No [ ] [1] Yes [ ]

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

[0] No [ ] [1] Yes [ ]

43. When you travel or leave home, do you sometimes forget to bring along your medicine?

[0] No [ ] [1] Yes [ ]

44. Did you take all your medicine yesterday?

[0] No [ ] [1] Yes [ ]

45. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?

[0] No [ ] [1] Yes [ ]

46. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?

[0] No [ ] [1] Yes [ ]

47. How often do you have difficulty remembering to take all your medicine?

___A. Never/rarely

___B. Once in a while

___C. Sometimes

___D. Usually

___E. All the time

Adherence Score…….