SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES,

UNIVERSITY OF GHANA

THERAPEUTIC COMPLIANCE AMONG HYPERTENSION PATIENTS IN SELECTED POLYCLINICS IN THE ABLEKUMA –SOUTH SUB METRO OF THE GREATER ACCRA REGION

BY

AYANORE AUGUSTINE ADOLIBA

(10148269)

A DISSERTATION SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA IN PARTIAL FULFILLMENT FOR THE AWARD OF THE MASTERS OF PUBLIC HEALTH (MPH) DEGREE.

JULY, 2018
DECLARATION

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

Ayanore Augustine Adoliba
(Student)

Date..................................................

Dr Samuel O. Sackey
( Academic Supervisor)

Date..................................................

DEDICATION

I wish to dedicate this work to my parents Mr and Mrs Ayanore and my sisters (Teni and Ellen),

brothers (Jonas, Adua, Francis and especially Martin and Sebastian) for been such needed

motivation.
ACKNOWLEDGEMENT

I wish to, first of all, express my sincerest gratitude to the Almighty God for his continuous blessings and protection, and for seeing me through this Master of Public Health programme.

I also acknowledge the priceless contribution of my project supervisor, Dr Samuel O. Sackey towards the success of this study. May the Almighty God continue to bless you and your family?

Also, my profound gratitude goes to the Head of Department and staff of the Epidemiology department for their support throughout my study.

My similar gratitude goes to the medical superintendents of Dansoman and Mamprobi polyclinics, the Doctors and the nursing staffs at the various hypertension clinics for their support.

Finally, my appreciation goes to my family and friends especially Martin and Sebastian for guiding and supporting me in my study.
ABSTRACT

BACKGROUND: The global incidence of hypertension is fast rising and has become a challenge to both developed and developing countries; it is one of the most prevalent non-communicable diseases accounting for a greater burden of diseases in Ghana. Several factors have been noted in the literature to possibly account for low compliance especially for chronic diseases such as hypertension.

OBJECTIVE: The objective of the study was to determine the patient, health system, disease and therapy related factors that influence compliance and also the proportion of patients who comply on medicinal and non-medicinal therapy.

METHOD: This descriptive cross-sectional study was conducted at Dansoman and Mamprobi polyclinics among 356 hypertensive patients 18 years and above, quantitative data were analyzed using STATA version 14, Pearson Chi- square test was used to identify statistically significant association in a bivariate analysis. A multivariate logistic regression was used to estimate the strength of association between the independent variables and the outcome variable.

RESULTS: This study found statistical significant association between patient age (P value -0.016), involvement in physical exercise (P value -0.000), length of patient diagnosis (P value -0.000), blood pressure category (P value -0.009), patient waiting time (P value -0.000) and medication adherence/compliance. About 86% of respondents had good medication compliance and just about 46.3% routinely having exercise as part of management and about 41.3% making modification to their salt intake and about 25.3% making changes to saturated fat consumption.

CONCLUSION: Overall majority of respondents had good medication compliance and with less than 50% of the respondents engaging in non-medicinal therapies like dietary modification and exercise.
# TABLE OF CONTENTS

DECLARATION ........................................................................................................................................ i
DEDICATION ........................................................................................................................................ ii
ACKNOWLEDGEMENT ........................................................................................................................ iii
ABSTRACT ........................................................................................................................................ iv
TABLE OF CONTENTS .......................................................................................................................... v
LIST OF TABLES ................................................................................................................................... viii
LIST OF FIGURES ................................................................................................................................ ix
LIST OF ABBREVIATIONS ................................................................................................................ x
CHAPTER 1 ......................................................................................................................................... 1
INTRODUCTION ................................................................................................................................. 1
  1.1 BACKGROUND ......................................................................................................................... 1
  1.2 Problem Statement .................................................................................................................... 7
  1.3 Justification .............................................................................................................................. 7
  1.4 Research questions .................................................................................................................. 9
  1.5 General/Specific objective ....................................................................................................... 10
  1.6 Conceptual Framework ........................................................................................................... 10
CHAPTER TWO ............................................................................................................................... 13
LITERATURE REVIEW ...................................................................................................................... 13
  2.1 Compliance To Treatment ....................................................................................................... 13
  2.2 Factors Influencing Therapeutic Compliance: Patient-centred factors ................................ 14
    2.2.1 Age .................................................................................................................................. 14
    2.2.2 Gender ............................................................................................................................ 16
    2.2.3. Educational level ......................................................................................................... 16
    2.2.4 Marital status .................................................................................................................. 17
    2.2.5 Perception of Disease ..................................................................................................... 17
    2.2.6 Smoking or Alcohol Intake ............................................................................................ 18
  2.3 Factors Influencing Therapeutic Compliance: Therapy-related Factors ............................ 19
5.7 Limitations of study................................................................. 51

CHAPTER SIX.................................................................................. 53

6.1 CONCLUSIONS......................................................................... 53

REFERENCES.................................................................................. 55

Appendix 1...................................................................................... 67
LIST OF TABLES

Table 3.1 List of the independent variable to be measured 25

Table 4.1 Demographic characteristics of hypertension patients in ablekuma south sub metro 34

Table 4.2 Logistic regression showing crude odd ratio and adjusted odd ratio of association between compliance level and demographic characteristic of hypertensive patient in ablekuma south sub metro 36

Table 4.3 Logistic regression showing crude odd ratio of association between sometimes forgetting to take medication and age demographic characteristic of hypertensive patient in ablekuma south sub metro 40
LIST OF FIGURES

Figure 1 Conceptual framework illustrating factors influencing therapeutic compliance among hypertension patients 12

Figure 4.1 Overall difference of levels of illness perception and compliance of medication adherence among hypertensive patient in Ablekuma South sub metro. Error bars represent confidence intervals 41

Figure 4.2 Sex difference association of compliance level of medication adherence among hypertensive patient in Ablekuma South sub metro. Error bars represent confidence intervals 42
LIST OF ABBREVIATIONS

AOR- Adjusted Odds Ratio

BP - Blood Pressure

CI - Confidence Interval

COR- Crude Odds Ratio

JNC- Joint National Committee

MMAS8 - Morisky Medication Adherence Scale-8

NCD- Non-communicable diseases

OPD - Outpatient Department

WHO- World Health Organization
DEFINITION OF KEY TERMS

Therapeutic Compliance: ‘Patient’s attitude in terms of taking medications, following a diet or undertaking lifestyle changes as per the health care providers’ recommendations for health and medical outcome’.

Adherence: ‘defined as the willingness and ability to follow a prescribed therapeutic regime’.

Concordance: ‘when the patient/client, is the decision maker in the process and denotes patient-prescribers harmony and agreement’.
CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Hypertension has become a public health challenge that is faced by both advanced and third world countries. It is one of the most common chronic non-communicable diseases globally. Worldwide, an estimated twenty-five percent (25%) of the world’s population is affected (Burtnett & Lederer, 2013). A total of one billion cases of hypertension had been reported in the year 2000; with a projected increase in cases of about thirty percent (30%) by the year 2025 (WHO, 2013).

According to Kearney et al., (2005), Hypertension is a well-established risk factor for cardiovascular diseases with a proportional growing prevalence and poor control, particularly in developing countries. It is estimated that by the year 2030, mortality from cardiovascular diseases in the adult population is projected at 23 million with about 85% of it occurring in developing countries (Mathers & Loncar, 2006).

The World Health Organization (WHO) ranks hypertension as the number one cause of death, accounting for about 17 million deaths per year worldwide (WHO, 2013). Early diagnosis and treatment commencement of hypertension can reduce the course of the disease and hence the occurrence of complications. Unfortunately, the global increase in morbidity reflects inadequate methods of detection, treatment and control of the condition (Kearney et al., 2005; Addo et al., 2013). The estimated proportion of hypertension in Ghana was about 46.90% (Osafo et al. 2011). Similarly, Ephraim et al. (2015), estimated the prevalence of about 30% in Ghana.
The prevalence of hypertension is increasing rapidly in developing countries, particularly in sub-Saharan Africa, largely on account of increasing life expectancy and the effect of factors such as an unhealthy diet, obesity and physical inactivity (Seedat, 2004, Singh et al. 2004). The prevention of hypertension is workable and good control leads to a reduced incidence of complications such as stroke, coronary artery disease and heart failure. Hypertension in Ghana is ranked as the highest cause in cases of morbidity and accounts for about 7% of total years of life lost nationally (Addo et al., 2013; Agyemang et al., 2012).

The Ghana Health Service (GHS) report, (2008), depicted an increase in the incidence of hypertension recorded across government health facilities in Ghana from 49,087 in 1988 to 505,180 in 2007. A Study by Bosu, (2010), in Ghana, estimated a crude prevalence between 25% and 48%, using the category of 140/90 mmHg with the proportions higher in urban populations than in rural populations. A survey showed higher proportions across different ethnic groups and in different regions; 28.7% in Kumasi, 32% in Bawku/Zebilla, 36.9% in Keta-Dzelukope, 47.8% amongst a cohort of women in Accra (de-Graft Aikins, 2007). Hypertension is said to be prevalent in urban areas than in rural areas, and in the Greater Accra Region, hypertension has moved to be the second highest cause of admissions in individuals over age forty-five, next to malaria which remains number one (Bosu, 2010).

In 2007 hypertension became the second cause of out-patient morbidity in the Greater Accra Region, according to the Ghana Health Service Report, 2008. A study conducted by Amoah, (2003) in the capital Accra, estimated proportions of hypertension in urban Accra was estimated at 28.3%.
Though awareness about hypertension has improved among the Ghanaian populace, optimal blood pressure control is still minimal, and a study shows that about 33% of Ghanaians were aware of their diagnosis, however, only 4% had optimal blood pressure control (Spencer et al., 2005).

Ghana’s health system is faced with many challenges that make it not entirely capable of handling the new evolution of the double burden of diseases in terms of financial, human resources, and equipment (De-Graft Aikins, 2007). It is noted that the National Health insurance scheme does not provide coverage for all antihypertensive medications, hence, most patients have to buy out of pocket for some medications (Tagoe, 2012).

This economic challenge allows a lot of patients to seek alternative remedies in addition to their antihypertensives by use of herbal medications (Abel & Busia, 2009). Studies show that the mode of treatment adopted by a patient is driven by his/her perceived natural of causes of the hypertension (Meli et al., 2009).

Hypertension is diagnosed if an average systolic blood pressure $\geq 140$ mmHg, or diastolic pressure $\geq 90$ mmHg. For optimal hypertension control, taking medications together with other therapy initiatives like exercise, diet and lifestyle (alcohol intake /nicotine use) modification have been designed purposely to prevent high blood pressure complications. However poor blood pressure control is attributed to poor compliance to the above prescribed therapies (Gupta, Arshad, & Poulter, 2010).

According to the American Heart Association, new classification of hypertension /American College of Cardiology (ACC) blood pressure 120/80 mmHg is now normal, 120-129/80mmHg – Elevated blood pressure, 130-139/80-89 mmhg–stage 1 hypertension and any blood pressure
140/90 mmHg is stage 2 hypertension, which is now the new guideline used instead of the classification proposed by JNC 7 (the Seventh Joint National Committee) on Prevention, Detection, Evaluation and Treatment of Blood Pressure report, defined by various levels of systolic and diastolic categories (Convertino, 2012). Normal levels are indicated by BP combination of < 120/80 mmHg, Prehypertension with combinations (120-139/80-89) mmHg, Stage one hypertension with combinations (140-159/90-99) mmHg and Stage two hypertension with combinations (≥160/≥100) mmHg (WHO, 2013).

The notable risk factors of hypertension are large with regards to poor lifestyle choices. Lifestyle habits like alcohol and smoking identify a vaso-constrictive effect which increases the pressure required to move blood through blood vessels. Obesity, which is usually a consequence of poor dietary habits and physical inactivity, increases the load placed on the heart because of the increased body mass thereby increasing blood pressure in the process (Thayer, Yamamoto, & Brosschot, 2010).

To add, research states that a person has about 45% risk when both parents are diagnosed with hypertension and about 30% with only one parent been hypertensive (Ezzati et al., 2002).

Hypertension is not curable; however effective management can modify its advancement. A class of drugs known as Antihypertensive therapy are prescribed in addition to other non-medicinal therapies like exercise, modification of diet especially salt intake, cutting down on alcohol and smoking habits, and they are required to take one or more essential antihypertensive medicines for life. The medicines may include a thiazide diuretic, an angiotensin converter enzyme inhibitor, long-acting calcium channel blockers, beta blockers, a statin (antilipids) and aspirin (WHO, 2013). It is recommended that a hypertensive patient with risk for other heart
diseases be given prompt and optimum antihypertensive therapy for optimal blood pressure control to reduce their overall risk (WHO, 2013).

The integrated non-communicable disease programmes have been developed and implemented through primary healthcare, as cost-effective ways for developing countries to tackle hypertension due to the cost involved in acquiring antihypertensive medications for a lifelong treatment and also for optimal blood pressure control. These programmes utilize non-pharmacological methods such as changing patient lifestyle habits like smoking and alcohol intake, modification in the diet in terms of salt intake and consumption of saturated fats, knowledge and health beliefs in the management of hypertension (Spencer, Phillips, & Ogedegbe, 2005, WHO, 2013). One of such lifestyle-related initiative is the salt reduction initiative, carried out successfully by countries like Finland, the United Kingdom (UK), the United States of America (USA) and more recently launched in several developing countries (WHO, 2013). A reduced intake of salt is accompanied by a reduction of both systolic and diastolic blood pressures of about 10mmHg or more (Aggarwal & Mosca, 2010; WHO, 2013). Other lifestyle modification recommendations are weight reduction which reduces BP by about 5-20mmHg per 10kg of weight loss, regular aerobic activities which reduce BP by 4-9mmHg and moderation of alcohol consumption which reduces BP by 2-4mmHg (WHO, 2013).

Increased occurrence of hypertension and its associated complications and morbidities has been attributed to poor compliance to medications, lifestyle risk factors such as, physical inactivity, poor dietary (saturated fats /high sodium) habits, excessive stress, alcohol and nicotine abuse (WHO, 2013). Adverse social factors usually linked to poor lifestyle choices such as smoking
and unhealthy diets, serve as predictors of hypertension risk (Nilsson, 2009; WHO, 2013). Similarly, social and economic factors such as rapid globalization, patient income and education, act as drivers of health behaviours that increases or decreases one’s risk of developing hypertension and its complications (Saounatsou et al., 2005; WHO, 2013).

The goal of every medical therapy prescribed by a health care provider is to achieve some desired outcomes, and these outcomes are largely a part of the objectives in the disease management and control (Jing et al., 2008). Non-adherence to prescribed medical therapy is a complex obstacle, especially for chronic diseases patients. Non-compliance is a fast growing issue that has a potential of undermining the benefits expected from treatments and interventions (Haynes et al., 1997, Hornes R. 1997).

According to Sackett et al, (1976), ‘Compliance is ‘clients’ behaviour in taking medicines, following a diet or undertaking lifestyle changes as per the health caregivers’ recommendations for health and medical advice’. Other terminologies used interchangeably in medical practice are; ‘adherence - the willingness to follow prescribed therapy and the term concordance - which makes the client the decision maker in the process and denotes patient-prescribers harmony an agreement’.

Therapy compliance does not just mean patient/client compliance with their medications but similarly to their non-medical therapies like diet, exercise, lifestyle changes and follow up of appointments and doing routine follow up laboratory investigations (Jing 2005). Medication compliance is defined as taking 80-120% of medications prescribed by a physician (Sackett et al. 1975, Monane et al. 1996, Avorn et al. 1998, Hope et al. 2004).
Poor medication compliance has been recognized as a major clinical problem globally with several factors influencing patient behaviour towards treatment. Factors that have been explored in literature as the general determinants of compliance include socio-demographic (age, marital status, educational levels, work schedules), the disease perception and treatment regimen (pill burden/treatment complexities) as well as Health Care system factors like accessibility of health care (Duah et al., 2013; Cooper et al., 2005).

Literature has identified relevant factors (patient, therapy, health system factors, socioeconomic, and disease status) relating to therapy compliance, the evidence indicates that non-adherence is an obstacle in healthcare and no meaningful change is achieved despite the numerous studies to address and magnify the problem. To add, too few studies have been done to quantify the impact of non-adherence on health and financial outcomes (Jin, 2008).

1.2 Problem Statement

Patient/client compliance with medical therapy is said to be on a low, generally, in the case of chronic diseases like hypertension and also for self-administrated medications. Low compliance is an increasing public health concern as it is seriously undercutting the expected gains of medical therapy (Haynes 1997).

According to Donovan, (1995), the rate of therapeutic non-compliance generally for chronic illnesses was estimated at about 40-50 percent and is said to cost 100 billion dollars. It accounts for about 10% of the hospital inpatients, about 23% of nursing home cases and about 33-69 percent medication non-adherence admissions (Sanson—Fisheret al. 1992, Osterberg and Blackchke 2005). In addition, the proportion of non-compliance for short-term medical therapy
is much higher, estimated to be about 70 and 80 percent, while therapeutic compliance for lifestyle change is lowest at about 20-30 percent (Dimatteo 1995).

According to Sabate, (2003), the compliance for hypertension therapy is reported to vary between 50% and 70%. Similarly, a study by Moname et al., (1996), found compliance for hypertension therapy at 49%, with only 23% of patients having good compliance levels at 80% or more. According to Rubin, (2005), data on the level of compliance on chronic diseases in African countries is sparse. A study by Botchwey, (2014), estimated the compliance in hypertensive patients in Ghana to be about 32.6% while a related study in Nigeria found only 31.2% of patients on antihypertensive drugs being compliant (Busari et al., 2010).

The factors accounting for low non-therapeutic compliance among patients are myriad and can be broadly stated in terms of patient-centered factors, physician-related factors, and health systems factors (Bandel et al., 2007).

1.3 JUSTIFICATION

The consequences of non-compliance include poor treatment outcomes especially in chronic diseases like hypertension and rising mortalities from complications like cardiovascular diseases, strokes, chronic kidney diseases, retinopathies (blindness), among others. According to McMahon et al., (2008), globally, about 9.4 million people die each year due to complications associated with hypertension, with developing countries contributing about 8% to this disease burden. The WHO’s global brief states that 45% of cardiovascular deaths, and 51% of deaths from strokes are as a result of blood pressure complications (WHO, 2013). In hypertension, poor therapeutic compliance is a key determinant for poorly controlled blood pressure hence rising risk of renal impairment (CKD), myocardial infarction and stroke (WHO, 2013).
Hypertensive clients who had poor adherence dropped out of treatment and hence had no therapeutic benefits (Lim and Ngah 1991). Also, increasing financial burden on family/patients budgets, as well as health insurance budgets, has been noted on account of non-compliance allowing for factors like frequent facility visits, emergency admissions and higher cost of treatments (Bond and Husser, 1991, Svarstad et al. 2001). In 2001, the financial burden of poor blood pressure control in Ghana was estimated at two billion dollars (Bosu, 2010).

Indirectly, non-compliance leads to loss of productivity for national growth and negatively affects the quality of life (Osterberg and Blackchke 2005). Furthermore, undetected or unreported non-compliance mostly results in misleading physician to change or increase regimen, which does not only affect the cost and complexity or poly-pharmacy but also the overall health care system (Vermeire et al., 2001).

The above shows clearly the mortality and morbidity burden of non-compliance on therapy as well as the social and financial implications to family and the health system in general, hence the need for this study to determine the factors that influence compliance among hypertensive patients and for appropriate policy and treatment targeted at improving compliance among hypertensive patients.

1.4 Research questions

- What factors affect therapeutic compliance in hypertension patients?
- What proportion of hypertension patients do not comply on therapy?
- What proportion of hypertension patients comply on their therapy?
- What proportion of hypertension patients comply on non-medicinal therapies?
1.5 General objective

To assess the factors influencing therapeutic compliance among hypertension patients in selected polyclinics in The Ablekuma South sub-metro in the Greater Accra Region of Ghana.

SPECIFIC OBJECTIVES

- To assess patient factors that influence therapeutic compliances (medicinal) in hypertension patients.
- To assess therapy-related factors that influence therapeutic compliances (medicinal) in hypertension patients.
- To assess health system factors that influence therapeutic compliances (medicinal) in hypertension patients.
- To assess disease-related factors that influence therapeutic compliances (medicinal) in hypertension patients.
- To assess compliance on exercise, lifestyle modification and diet of hypertension patients.

1.6 Conceptual Framework

This framework illustrates the relationship between patient-centered factors, health delivery system factors, treatment-associated factors, disease-associated factors and therapeutic compliance, as well as the inter-relations between patient factors and disease factors, socioeconomic factors and disease factors, socioeconomic factors and health system factors and patient factors and health system factors. The framework shows how patient-centred factors like age or higher educational level can influence compliance positively or even negatively as shown from other studies. Similarly, therapy-related factors like treatment complexity and the duration
of treatment has been shown to have a linkage to medication compliance, as it is noted that the longer the duration the reduced odds of compliance, and also large pill burden might negatively affect compliance as patients will get fed up of taking many pills for a long time. To add the relationship between health system factors like long waiting times at the clinics can turn to affect compliance negatively. Further more the frame work shows us the effects that socio-economic variables like cost and social support have on patient compliance, for instance elderly patients with good social support turn to have good compliance and like wise patients who acquire medication or who have their treatment cost absorbed by any form of insurance turn to have good compliance than those who pay from their pockets. Last but not the least the effects of diseases factors like the severity and symptoms are noted to affect compliance, for instance severe and symptomatic stages of a disease should be determining factor for patients to comply on therapy, however, the reverse could be true as some patients might just abandon the treatment if symptoms are worse with the thinking that the therapy is not working for them all together.

It is also stated in the framework how patient factors such as age, educational status and patient beliefs can affect the disease factors like symptoms and severity, for instance younger hypertensive patients only appreciate the disease when it presents them with symptoms that are deemed severe and that can equally be due to the educational level of those patients to apprehend the disease and its symptoms. Also, a relationship can exist between patient socio-economic factors like income and social support and other factors such as disease factors, for instance good social support has a positive effect on disease severity and like wise improves symptoms, same can be said about socio-economic factors such as, busy schedules at work and health system factors like getting refill for their medications. Lastly, there is a shown linkage between patient factors such as, patient beliefs, attitude and a factor like unhappy clinic hours.
Patient factors

i. Demographic Factors: Age, Gender, Education, Marriage Status
ii. Psychosocial factors: Beliefs, Motivation, Attitude
iii. Patient-prescriber relationship
iv. Health literacy: Patient knowledge
v. History of good compliance

Disease factors

i. Disease symptoms
ii. Severity of the disease

Therapy related

i. Route of administration
ii. Treatment complexity
iii. Duration of the treatment period
iv. Medication side effects
v. Degree of behavioral change required
vi. Requirements for drug storage

Healthy system factors

i. Lack of accessibility
ii. Long waiting time
iii. Difficulty in getting prescriptions filled
iv. Unhappy clinic visits

Social economic factors

i. Inability to take time off work
ii. Cost and Income
iii. Social support

Figure 1 Conceptual framework illustrating factors influencing therapeutic compliance among hypertension patients
CHAPTER TWO
LITERATURE REVIEW

2.1 Compliance To Treatment

Hypertension like other chronic diseases involves long-term management. Compliance with therapy is a key component to management and desired outcomes. Compliance is defined as the “practice of obeying rules or requests made by people in authority” (Oxford Advanced Learner’s Dictionary of Current English). Compliance is when a patient’s behaviour (in terms of taking medication, following diets or executing lifestyle changes) coincides with healthcare providers’ recommendations for health and medical advice (Haynes et al., 1976; À Sever & Messerli, 2011).

Poor compliance has the potential to lead to severe disease complications as well as treatment failure. In the USA, poor compliance is said to causes about 30% of treatment failure and accounting for about 125,000 deaths annually (Gupta et al., 2010). Globally, the prevalence of compliance on long-term therapy on medication has been found to decrease after the first six months with studies converging at 50% compliance level (Glader et al. 2010, Nilsson, 2009; Mathers, 2008).

It is noted that therapeutic compliance is poor for conditions that have the potential to result in fatal adverse outcomes (Loghman-Adham, 2004). Poor compliance is usually associated with people living with chronic conditions like hypertension, diabetes, epilepsy/seizures, asthma, and people who undergo organ transplants and chronic haemodialysis among others (WHO, 2013). Compliance with therapy for patients with hypertension is estimated at 50% after 1 year and 85% after 5 years (Sabaté, 2003).
Studies have shown that patient medication adherence for hypertension varies between 50% and 70% (Sabaté 2003). In a related study in the US, Moname et al. found that medication compliance averaged 49%, and only 23% of the patients had good compliance levels of 80% or higher (Monane et al. 1996).

The common forms of non-compliance encountered in medical therapy as stated by Jin et al. (2008), include, non-refilled prescription, incorrect doses, taking medications at the wrong times, stopping the treatment without physicians consent, non-participation in clinic visits, having drug holidays. “In clinical medicine, what is considered to be good or acceptable compliance?” Compliance has generally been defined as taking 80 to 120% of the medication prescribed, though this definition still has a lot of controversies (Sackett et al. 1975; Monane et al. 1996; Avorn et al. 1998; Hope et al. 2004). However, with non-medicinal therapies such as exercise or diet, the definition acceptable varies from study to study and there is no common accepted criterion to define good or acceptable compliance.

2.2 Factors Influencing Therapeutic Compliance: Patient-centred factors

2.2.1 Age

Extensive research has been done on how patient age is said to affect compliance, and they seem to suggest a positive correlation between age and compliance/medication adherence, however, a few articles did not establish any correlation between age and compliance/medication adherence (Lorenc and Branthwaite 1993; Menzies et al. 1993; Wild et al. 2004; Wai et al. 2005). The effect of age was further divided into 3 major groups namely elderly (more than 55 years), middle age (40-54 years) and the young (under 40 years).
For elderly patients, studies have not been unidirectional, a large number of studies suggested high compliance among this age group (Norman et al 1985; Didlake et al 1988; Schweizer et al 1990; Shea et al 1992; Monane et al 1996; Buck et al 1997; Viller et al 1999; Sirey et al 2001; Kim et al 2002; Senior et al 2004; Hertz et al 2005). In some other related studies, advance in age affected compliance negatively (Okuno et al. 1999; Benner et al. 2002; Balbay et al. 2005). Nevertheless, there were other confounding factors in these studies that could have explained the findings. Several studies attempted to give plausible reasons for poorer compliance among the elderly patient, for instance, Elderly patients may have problems with their vision, hearing and memory. In addition, they are more likely to have difficulties in following therapy instructions due to cognitive impairment or other physical difficulties, such as trouble swallowing tablets, opening drug containers, and handling small tablets (Murray et al 1986; Stewart and Caranasos 1989; Chizzola et al 1996; Nikolaus et al 1996; Okuno et al 2001; Benner et al 2002; Jeste et al 2003; Cooper et al 2005). On the contrary, older patients may have more concern for their health condition than younger patients. Hence older patients’ non-compliance/adherence is said to be unintentional largely, as far as they can get the necessary help from caregivers/family members.

In comparison, there is much similarity in the study’s findings between younger aged and medication compliance, where Middle-aged patients were less likely to comply with therapy. A study in Japan found patients (40–59 years) less likely to be compliant to the medication theory (Iihara et al. 2004). Similarly, young patients less than 40 years were found to have a low compliance to therapy (Neeleman and Mikhail 1997; Leggat et al. 1998; Loong 1999; Siegal and Greenstein 1999). In Singapore, patients who were under 30 years old were found to be less likely to purchase the medication prescribed (Loong 1999). Reasons like their work and busy
schedules may make them not comply with treatment or spend a long time waiting for clinic appointments across the above studies cited.

2.2.2 Gender

In a lot of studies reviewed relating to patient gender, the findings are contradictory. Some studies found female gender to be significant with compliance (Degoulet et al. 1983; Chuah 1991; Shea et al. 1992; Kyngas and Lahdenpera 1999; Viller et al. 1999; Kiortsis et al. 2000; Lindberg et al. 2001; Balbay et al. 2005; Choi-Kwon 2005; Fodoret et al. 2005; Lertmaharit et al. 2005), while other studies found otherwise (Frazier et al. 1994; Sung et al. 1998; Caspard et al. 2005; Hertz et al. 2005). Meanwhile, other studies could not find a relationship between gender and compliance (Menzies et al. 1993; Buck et al. 1997; Horne and Weinman 1999; Ghods and Nasrollahzadeh 2003; Spikmans et al. 2003; Senior et al. 2004).

2.2.3. Educational level

Jin et al. (2008), concluded that, the relationship between educational level and medication compliance was equivocal after having reviewed about 13 articles relating to the subject notwithstanding that different criterion were used to define higher and lower education. Some studies found a positive correlation between respondents with higher educational status and higher compliance (Apter et al. 1998; Okuno et al. 2001; Ghods and Nasrollahzadeh 2003; Yavuz et al. 2004), while in other studies there was no association, (Norman et al. 1985; Horne and Weinman 1999; Spikmans et al. 2003; Kaona et al. 2004; Stilley et al. 2004; Wai et al. 2005), generally, it is assumed that patients with better educational level should have better knowledge about the disease and it’s management and therefore be more compliant, however DiMatteo found the contrary, that such patients may not even have a better understanding of the
disease and subsequently were more non-compliant than those with lower educational status or no education (DiMatteo 1995). Other studies had even found respondents/patients with lower education more compliant than those with high education (Kyngas and Lahdenpera 1999; Senior et al. 2004).

2.2.4 Marital status

Status showed that marital status has a significantly positive association with patient medication compliance (Swett and Noones 1989; Frazier et al. 1994; De Geest et al. 1995; Turner et al. 1995; Cooper et al. 2005). With the reasoning that support from their spouses may make them more likely to comply with medication than those not married. On the contrary, five studies did not find any relationship between marital status and compliance (Ghods and Nasrollahzadeh 2003; Spikmans et al. 2003; Kaona et al. 2004; Wild et al. 2004; Yavuz et al. 2004). The postulated difference was explained in terms of the fact that there may be variations between the study populations.

2.2.5 Perception of Disease

A review of about 23 articles of compliance by Jin et al, (2008), revealed that most patients’ beliefs about disease causation, and zeal to adhere to treatment were correlated to their compliance (Lim and Ngah 1991; Buck et al. 1997; Cochrane et al. 1999; Kyngas 1999; Kyngas 2001; Kyngas and Rissanen 2001; Vincze et al. 2004).

Results from the related studies, showed that compliance was better when the patient had the following beliefs: the client felt susceptible to the disease or complication (Haynes et al. 1980; Abbott et al. 1996; Spikmans et al. 2003), the client believes that the illness or its complications
pose severe consequences for his/her health (McLane et al. 1995; Sirey et al. 2001; Loffler et al. 2003), the client believes that the therapy is effective or anticipates benefits from the treatment (Lorenc and Branthwaite 1993; De Geest et al 1995; Cochrane et al 1999; Horne and Weinman 1999; Apter et al 2003; Spikmans et al 2003; Krousel-Wood et al 2004; Wild et al 2004; Gonzalez et al 2005; Seo and Min 2005). On the contrary, misconceptions or erroneous impressions by clients lead to poor compliance. Similarly, patient’s negative beliefs about the treatment, or outcome and religious belief might worsen the burden of non-compliance on therapy. A study done in Malaysia revealed that some hypertensive patients believed the use of “Western” medication was “harmful”, and they were more confident in natural remedies (Lim and Ngah 1991). Another related study in New Zealand found that Tongan patients believed the disease is God’s will and not under the control of man, and believed there is no need for medication (Barnes et al. 2004).

2.2.6 Smoking or Alcohol Intake

According to some studies hypertensive patients who smoke or drink alcohol were non-compliant on medications than those who did not (Degoulet et al. 1983; Shea et al 1992; Turner et al 1995; Leggat et al 1998; Kyngas 1999; Kyngas and Lahdenpera 1999; Kiortsis et al 2000; Kim et al 2002; Ghods and Nasrollahzadeh 2003; Yavuz et al 2004; Balbay et al 2005; Cooper et al 2005; Fodor et al 2005). A study in Finland among hypertension patients found that non-smokers were more compliant to the diet restrictions than smokers (Kyngas and Lahdenpera 1999).
2.3 Factors Influencing Therapeutic Compliance: Therapy-related Factors

2.3.1 Treatment complexity

Treatment complexities in terms of pill burdens or dosing frequency have been found significant with medication adherence/compliance. However, compliance does not have significant association with number of pills (Horne and Weinman 1999; Patal and Taylor 2002; Grant et al. 2003; Iihara et al. 2004), rather, dosing frequency of medications was significant (Kass et al. 1986; Cockburn et al. 1987; Cramer et al. 1989; Eisen et al. 1990; Cramer 1998; Sung et al. 1998; Claxton et al. 2001; Iskedjian et al. 2002). It was noted that patients adherence reduced as the frequency of dosing increased, as shown in a study, non-compliance was: 20% for once daily, 30% for twice daily, 60% for three times a day and 70% for four times daily (Cramer et al. 1989). A meta-analysis found that there was a difference in compliance rate between daily dosing and twice daily dosing, 92.1% and 88.9%, respectively (Iskedjian et al. 2002).

2.3.2 Duration of the treatment period

Generally, it is noted that higher compliance is associated with acute illnesses than non-infectious/chronic illnesses (Gascon et al. 2004). Similarly, longer duration of treatment negatively affects compliance (Menzies et al. 1993; Ghods and Nasrollahzadeh 2003; Dhanireddy et al. 2005). On the contrary, in some studies, longer duration of the disease positively affected compliance (Sharkness and Snow 1992; Garay-Sevilla et al. 1995), as compared to newly diagnosed patients (Caro et al. 1999). The reasoning is that chronic disease patients have accepted their diagnosis and treatment options compared to newly diagnosed or acute illnesses.
2.3.3 Adverse/Side Effects of Medication

A review of about seventeen (17) articles by Jin et al in 2014, on medication side effects and compliance found medication side effects as serious threat in disease management (Spagnoli et al 1989; Shaw et al 1995; Buck et al 1997; Dusing et al 1998; Hungin 1999; Kiortsis et al 2000; Linden et al 2000; Kim et al 2002; Dietrich et al 2003; Grant et al 2003; Loffler et al 2003; Sleath et al 2003; Iihara et al 2004; Kaplan et al 2004; Ponnusankar et al 2004; O’Donoghue 2004). In a related study in Germany, adverse drug effect was found as the second commonest cause of non-compliance with antihypertensive medication (Dusing et al. 1998). It is postulated that physical discomfort, scepticism about the efficacy of the medication mostly leads to mistrust in physicians and hence non-compliance (Christensen, 1978).

2.4 Factors Influencing Therapeutic Compliance: Socio-Economic Factors

2.4.1 Treatment Cost and Patients Income

Cost of treatment in terms of medication, purchasing power is pivotal to patient’s medication compliance/adherence especially for chronic diseases because of long treatment durations (Connelly 1984; Shaw et al. 1995; Ellis et al. 2004; Ponnusankar et al. 2004). This expenditure constitutes a large portion of living expenses for patients suffering from chronic diseases. Cost and income are proportionally related factors. It is expected that health delivery cost is not a major problem if the patient has a relatively high income or health insurance. Studies found, patients with no insurance cover (Swett and Noones 1989; Kaplan et al 2004; Choi-Kwon 2005), or with low income (Degoulet et al 1983; Cockburn et al 1987; Shea et al 1992; Frazier et al 1994; Apter et al 1998; Berghofer et al 2002; Benner et al 2002; Ghods and Nasrollahzadeh 2003; Hernandez-Ronquillo et al 2003; Mishra et al 2005) were more likely to be non-compliant.
to treatment. However, even for patients with health insurance, health expenses are not guaranteed compliance.

On the contrary, other studies found no association between patient income and compliance level (Norman et al. 1985; Lim and Ngah 1991; Patal and Taylor 2002; Stilley et al. 2004; Wai et al. 2005).

2.4.2 Time Commitment

Patients may be too occupied with work that they may not be able to have regular visits or even adhere to their medications (Shaw et al. 1995; Siegal and Greenstein 1999; Hernandez-Ronquillo et al. 2003; Lawson et al. 2005; Neal et al. 2005). There is postulation that a shorter travelling distance between residence and healthcare facilities could enhance patient’s compliance (Gonzalez et al. 2005). A related study suggested that white collar job patients have poor compliance because of other priorities that need their attention (Siegal and Greenstein 1999).

2.4.3 Social Support

It is a general finding in literature that patients who have good family, emotional support and social support systems are likely to adhere to treatment (Stanton 1987; Lorenc and Branthwaite 1993; Garay-Sevilla et al 1995; Milas et al 1995; Kyngas 1999; Okuno et al 1999; Stromberg et al 1999; Kyngas 2001; and Rissanen 2001; Thomas et al 2001; Loffler et al Therapeutics and Clinical Risk Management 2008; DiMatteo 2004; Feinstein et al 2005; Voils et al 2005). Good social environment is essential for improving patent attitude, motivation and serving as reminders to adhering to treatment.
2.5 Factors Influencing Therapeutic Compliance: Health Care System Factors

Availability and accessibility are the two most important factors in health care systems (Ponnusankar et al 2004). Lack of access to health facilities prolonged waiting time for review visits (Grunebaum et al 1996; Balkrishnan et al 2003; Moore et al 2004; Lawson et al 2005; Wai et al 2005), long waiting times at the pharmacy (Cummings et al 1982; Vlasnik et al 2005), and unsatisfied clinic visits (Spikmans et al 2003; Gascon et al 2004; Lawson et al 2005), all contributing to poor compliance in chronic disease patients, especially, those on insurance, as medications are only supposed to be prescribed for a specific period and hence regular visits are required. Evident is a study done by Haynes et al. (1980), which showed patient’s satisfaction with clinic visits was associated with improved compliance with the therapy.

2.6 Disease Factor

Studies have shown that diseases which do not produce initial acute symptoms and signs especially, chronic diseases are more likely to have patients not adhering to treatment (Hungin 1999; Kyngas and Lahdenpera 1999; Vlasnik et al. 2005). It was noted in that study that, 71% of respondents with symptoms reduced the intake of salt as recommended by the physician, as compared to 7% of the asymptomatic patients (Kyngas and Lahdenpera 1999). It was noted that those who had marked a reduction in symptoms complied better (Lim et al. 1992; Viller et al. 1999; Grant et al. 2003).

There has not been any evidence indicating that disease severity by assessment complies better with medications (Matthews and Hingson 1977; Kyngas 1999; Wild et al. 2004; Seo and Min 2005). A study in adolescents with asthma showed that patients with mild severity complied well with therapy (Kyngas 1999). No significant association was found in a related study between the
severity of the illness and compliance (Matthews and Hingson 1977). Instead, the perception of health status may have a more crucial influence on compliance with therapy. The patients who expect poor health outcome are more motivated to be compliant with treatment if they consider the therapy to be a remedy (Rosenstock et al. 1988).
CHAPTER THREE

METHODS

3.1 Study Design

The study employed a descriptive cross-sectional design in assessing the factors that influence therapeutic compliance among hypertensive clients/patients. This method was chosen because, it was able to measure, simultaneously, the exposure (independent) variables and that of the outcome (dependent) variables, from a client’s perspective at a relatively cheaper cost and faster rate (Mann, 2003). Quantitative data comprising dependent and independent variables were measured, and subsequent associations determined.

3.2 Study Area

The study was conducted across 2 randomly selected polyclinics in Ablekuma–South, sub-metro of the Accra Metropolitan Area (namely Dansoman and Mamprobi polyclinics) between 5th - 21st June 2018.

The Ablekuma–South, sub-metro is one of the 10 sub-districts of the Accra metropolitan area mainly made up of Korle-bu, Mamprobi and Dansoman.

Boundaries
North–Bounded by the Accra-Winneba road to Cable and Wireless, turns left to house number 475/16 through the Oshijai Street at house number B487/16 turns left and stretches to join the New Fadama-Darkuman road to link the motorway turning to Sewleg Street to the first range of Awoshie hills turning left again, along the hills to the boundaries between Kokroko (Ga District) and Awoshie.

South–The Gulf of Guinea from the point where the Korle Lagoon enters the sea at Korle-Gonno and westwards along the coastal lines to Panbros Salt Factory.
Kokroko Hills through swampy areas of the bridge on the Sakumono stream and Winneba road stretching along the stream to the starting point at Gbegbeyise. West-by the Odaw stream – off the Graphic road and Ashiedu Keteke.

The 2010 population and housing census, estimates the total population at about 96,281, with about 93.9% of this populace being literates.

### 3.3 Variables/Factors

The main outcome (dependent) variable in this study was therapeutic compliance, with the proxy of medication adherence using the morinsky 8 adherence scale to measure.

**Independent variables/exposure variables**

The independent variables in this research are shown in table 3.1 below

**Table 3.1 List of the independent variable to be measured**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Operational Definition</th>
<th>Indicator</th>
<th>Variable type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Self-reported age of respondent at last birth day</td>
<td>Age at last birth day</td>
<td>Continuous</td>
</tr>
<tr>
<td>Sex</td>
<td>Self-reported gender of respondent</td>
<td>Male or Female</td>
<td>Categorical</td>
</tr>
<tr>
<td>Religion</td>
<td>Religious denomination of woman at interview date; Others)</td>
<td>(Traditional; Christian; Muslim and others)</td>
<td>Categorical</td>
</tr>
<tr>
<td>Educational status</td>
<td>Self-reported educational level attained</td>
<td>No education; Primary; middle/Junior High School; Secondary; Tertiary</td>
<td>Categorical</td>
</tr>
<tr>
<td>Marital status</td>
<td>Self-reported marital status as at interview date)</td>
<td>Single; Married; Cohabiting; Separated; Widow</td>
<td>Categorical</td>
</tr>
<tr>
<td>Disease perception</td>
<td>Understanding of disease cause ,benefits</td>
<td>Likert perception score range from</td>
<td>Categorical</td>
</tr>
<tr>
<td>Variables</td>
<td>Operational Definition</td>
<td>Indicator</td>
<td>Variable type</td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Pill burden</td>
<td>of treatment , and complication of disease</td>
<td>strongly agree to strongly disagree score between 4-20</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td>Total number of medications currently</td>
<td>1 pill</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 -3-pills</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 4 pills</td>
<td></td>
</tr>
<tr>
<td>Duration of disease</td>
<td>Patient-reported duration of disease from year of first diagnosis</td>
<td>Under a year</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-2 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-4 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>More than 4 years</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Patient-reported cost involve in managing disease</td>
<td>Low</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Alcohol intake</td>
<td>Patient reported intake of alcohol currently</td>
<td>Yes</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>Patient reported history of smoking currently</td>
<td>Yes</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Regular exercise</td>
<td>Patient reported involvement in physical exercise</td>
<td>Yes</td>
<td>Categorical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sometimes</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 Study Population

The study population for this research was made of known hypertensive clients/patients, 18 years and above who attend the various special hypertension clinics of Dansoman (Thursday and Friday) and Mamprobi (Tuesday and Friday) polyclinics within the Ablekuma-South sub-metro of the Greater Accra region.

### 3.5 Sampling technique

Dansoman and Mamprobi polyclinics were selected at random from the list of polyclinics without replacement in the Ablekuma-South sub-metro of the Accra Metropolis, with well-established special hypertension clinics and then the total sample size of 370 determined and
samples were collected by proportion based on attendance at sessions but collected consecutively at every clinic day from those who meet the criteria till all required samples were gotten because of the short duration for data collection.

3.6 Sample Size

Thetotal sample size was estimated using the single population proportion formula, 

\[ N = \frac{Z^2 \cdot P}{D^2} \]  

Equation 1

where“P” is the estimated proportion of compliance in hypertensive patients from previous studies, and “d” is the acceptable margin of error.

\[ N = \text{sample size}, \]

\[ z = \text{reliability coefficient of 1.96} \]

\[ d = \text{error allowance of 0.05} \]

\[ p = \text{proportion of compliance of 32.6\% = 0.326 and} \]

The following assumptions were made:the portion of compliance among data for Ghana is estimated at 32.6\% (Botchwey,2014) and , d is 5\% , \((Z1-\alpha/2)\) at 95\% confidence interval is 1.96 and an expected non-response rate of 10\%.

\[ q = 1-p = 1-0.326-0.674 \]

\[ N=(1.96)^2(0.326)(0.674)/(0.05)^2=337 \]

With 10\% of non- respondent’s rate (33) gave a total of 370 hypertensive patients interviewed across the 2 polyclinics, but the final analysis included only 356 accurately completed
questionnaires, while the remaining were rejected due to incompleteness and errors in responses after vetting.

3.7 Data Collection Techniques

Data was collected by the use of a structured administered questionnaire to target population who met the inclusion criteria by the trained research assistants, included in this tool was demographic variables like age, sex, occupation, marital status including pill burden, the health system variables, socio-economic variables were ascertained.

Patients’ disease perception was measured by adapting the perception score “the Likert scale of modified illness perception questionnaire”. This structured questionnaire has four components, namely; Identity, Consequence, Cure control and Self-efficacy. The components were graded by a five-point Likert scale, ranging from “strongly agree” to “strongly disagree”. The highest possible score of 12-20 (good perception) and the lowest score of 4-11 (bad perception).

Identity refers to the illnesses that patients associate with antihypertensive therapy. Consequence refers to the improved life that hypertensive patients expect if compliant with therapy. Cure control addresses the significance that the hypertensive patients attach to antihypertensive therapy as a cure for their condition. Finally, self-efficacy addressed the role or responsibilities that hypertensive patients felt they had with respect to their condition. The higher the score, the better the perception a patient has of the antihypertensive therapy.

The Morisky 8-item Medication Adherence Scale was used as a proxy for therapeutic compliance in this study with dietary and exercise adherence measure based on responses from patients. A questionnaire is a self-reporting tool often used for screening medication compliance
in patients. It is made up of eight yes or no questions where a “yes, scores 0” and a “no, scores 1”.

A maximum score of between 3-8 constitutes non-compliance, a score of less or equal to 2 was defined as good compliance in this study. The advantages of this structured questionnaire are stated in terms of reducing cost, allowing uniformity and ease of comparison since same questions are asked all participants (Marshall, 2005).

3.8 Quality Control

The measurement scales included in this data collection tool had been previously validated in other studies and deemed appropriate for the purpose for which they will be used, in terms of perception and compliance. Equally respondent personal information was private and treated with the confidentiality, during data collection and analysis.

Data were stored electronically and under strong password protection. Data collected was manually checked to ensure the absence of errors and distortions of participant’s answers as well as its completeness.

3.9 Data Processing and Analysis

Data Analysis

All data were entered into Epi-data software on a carefully designed template and analysed using STATA software version 14. The outcome variable of compliance was a dichotomous score of good compliance (less than 2) or poor compliance of a score greater or equal to 3. However, the perception score was graded as between 4-11 (average perception) and a score 12-20 as good perception.
The relationship or test of association between the independent variables and outcome variables of therapeutically compliance (in this study medication adherence as proxy) was determined using Pearson’s Chi-square test at p-less than 0.05. Multivariate analysis using Logistic regression was used to determine the strength of association between all variables of interest in this study and compliance. Crudes and adjusted odds ratios were calculated for significant associations found.

3.10 Ethical Consideration/Review

Ethical approval was sought from the Review Committee of the Ghana Health Service (GHS) (GHSERC 129/12/17). Approval for the use of the two polyclinics was sought from the Chief Superintendent of respective facilities and OPD in charges through the regional director of health.

Consent forms were prepared for prospective participants who endorsed voluntarily either by signing or a thumbprint in the presence of a witness for the illiterate or those who could not sign, clearly identifying the investigator and topic of study and all data treated with high standards of confidentiality. Participants were allowed to withdraw from the study without any consequences to them in that regard.

No benefits were available for participants, and all were communicated prior to accepting to participate but this aimed at building a model for health professionals and policy makers in addressing the many challenges that come with compliance especially with chronic diseases like hypertension, so as to reduce the increasing morbidities and complications, as well as financial implications of non-compliance in the general population.
The study had no known potential risks to the participants or facilities and was clearly spelt out to the participants as well as the authorities of the facilities. The researcher had no conflict of interest, and this was clearly stated to all and sundry.

3.11 Pre-testing
The data collection instrument was pre-tested among hypertension clients or patients of the Madina Polyclinic on about 10% of total calculated sample size, and all errors/omissions in content were duly corrected before the final data collection.
CHAPTER FOUR

RESULTS

4.1 Demographic characteristics

Total of 356 hypertensive clients were interviewed and results showed that majority of respondents were between the ages of 60-69 years (37.6%), followed by those between the ages of 70-79 years, 50-59 years (20.5%), with the least number of respondents being less than 40 years (3.4%) and a mean age of total respondents being 64 years. About 83.1% of the total respondents were females; the remaining 16.9% were males.

Largely about 94.7% of total respondents were Christians, with just about 4.5% of the remaining been Muslims and 0.8% forming other minority religious groups. Majority of the total respondents were retired from active service/work forming 61.2% of total respondents, while 34.6% were engaged in trading and just about 4.2% in the formal government sector.

Of the total 356 respondents, about 37.1% had secondary education, while 28.1% had primary education, with about 25.3% having no formal education and just a few 9.6% having tertiary education. About 177(49.7%) of the total respondents were married, while 33.1% were widowed, with about 10.7% divorced respondents. Of a total of 356 respondents, about 90.7% of them did not drink alcohol, with about 5.3 % still actively drinking and just about 14 (3.9%) who used to drink but had ceased.

Similarly, out of the total respondents, a majority 351 (98.6%) did not smoke and just 1.1% use to smoke but had recently stopped. The results showed that about 41.3% of respondents had
modified their diet in terms of salt consumption, while just 25.3% of respondents have modified their fat intake and about 33.4% have not had any dietary modification as part of their management. Similarly, of a total of 356 respondents, about 46.3% usually do routine physical exercise as part of therapy, with the remaining either never or doing it once a while.

4.2 HEALTH SYSTEM FACTORS

Results, as shown in table 4.1, depicts that majority of respondents are given monthly review dates about 67.7% of respondents, about 24.2%, however, have 2 monthly reviews, with about 5.6 % having 3 monthly reviews .

Similarly results from table 4.1 shows that the majority of respondents were seen within 3 hours after visiting the facilities, with about just 32.6% of them being seen within 2 hours, and the remaining 19.9% seen after 3 hours, 8.7% of the respondents were seen within 30 minutes of visiting the facilities for follow up.

4.3 THERAPY RELATED FACTORS

This research revealed that the mean number of anti-hypertensive pill medications is about 2.6%, with about 94.7% of respondents on between 1 medication to 4 different medications for control and just about 5.3% of them taking about 5 or more different classes of anti-hypertensive medications.

Similarly from the results table 4.1, the mean length of diagnosis of respondents was 6.7 years, with majority being diagnosed between 1 and 5 years (54.2%), followed by 33.7% of respondents who were diagnosed or having the disease for between 6 to 10 years, 6.5% of
respondents being diagnosed for between 11-15 years and just 5.6% of them having the disease for more than 16 years to 40 years.

From figure 4.1, it is shown that at a confidence interval of 95%, the proportion of respondents who adhered highly to therapy or medications specifically was about 86% that those with MMS-8 score 2 or less, compared to just 14% with low/poor adherence at 95% confidence interval with morinsky 8 medications scores(MMA) scale greater than 2.

Similarly, the results show that about 271 respondents (76.1%) have had eye screening done as part of management and monitoring for complications while the remaining 23.9% have never had any of such test.

**4.4 DISEASE FACTORS**

The results from table 4.1 show about 30.3% of respondents blood pressures were within the category of elevated blood pressure that is between 121-129/80 mmHg, while 36% of respondents have blood pressures between 130/80-139/89 mmHg-stage 1 hypertension, about 13.9% of the respondents had blood pressure above 140/90 mmHg (stage 2 hypertension) according to the American heart association new classification of hypertension, however, 12.4% had blood pressures measuring less than 90/60 mmhg (hypotension levels).

It is shown from the study that the mean systolic pressure among the 356 respondents was 132.8 mmHg and with the mean diastolic pressure of 78.2 mmHg.
4.5 SOCIO-ECONOMIC FACTORS

Results from the study indicate that most of the respondents rely heavily on the NHIS for their medication, about 64.4%, while 26.1% pay out of pocket and another 5.1% having private health insurance and 4.2% of respondents using a combination of the above methods of funding.

Table 4.1 Demographic characteristics of hypertension patients in Ablekuma South sub metro

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Frequency N=356</th>
<th>Percentage %</th>
<th>Demographic variable</th>
<th>Frequency N=356</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td><strong>Antihypertensive pills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>12</td>
<td>3.4</td>
<td>1-4</td>
<td>337</td>
<td>94.7</td>
</tr>
<tr>
<td>40-49</td>
<td>22</td>
<td>6.2</td>
<td>5+</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>50-59</td>
<td>73</td>
<td>20.5</td>
<td>Mean(SD)</td>
<td>2.6(1.2)</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>134</td>
<td>37.6</td>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-79</td>
<td>90</td>
<td>25.3</td>
<td>Never</td>
<td>29</td>
<td>8.1</td>
</tr>
<tr>
<td>80+</td>
<td>25</td>
<td>7</td>
<td>Once in a while</td>
<td>123</td>
<td>34.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sometimes</td>
<td>39</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Usually</td>
<td>165</td>
<td>46.3</td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>64.4(10.9)</td>
<td></td>
<td><strong>Dietary habit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>Low sodium</td>
<td>147</td>
<td>41.3</td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>16.9</td>
<td>Low saturated fats</td>
<td>90</td>
<td>25.3</td>
</tr>
<tr>
<td>Female</td>
<td>296</td>
<td>83.1</td>
<td>No change</td>
<td>119</td>
<td>33.4</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td><strong>Any chronic condition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>337</td>
<td>94.7</td>
<td>Heart disease</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>Muslim</td>
<td>16</td>
<td>4.5</td>
<td>Diabetes</td>
<td>15</td>
<td>4.2</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>0.8</td>
<td>Stroke</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chronic kidney disease</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>334</td>
<td>93.8</td>
</tr>
<tr>
<td><strong>Occupational status</strong></td>
<td></td>
<td></td>
<td><strong>Do you drink alcohol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal sector</td>
<td>15</td>
<td>4.2</td>
<td>No</td>
<td>323</td>
<td>90.7</td>
</tr>
<tr>
<td>Retired</td>
<td>218</td>
<td>61.2</td>
<td>Yes</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>Trader</td>
<td>123</td>
<td>34.6</td>
<td>Stopped</td>
<td>14</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td><strong>Do you smoke</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>90</td>
<td>25.3</td>
<td>No</td>
<td>351</td>
<td>98.6</td>
</tr>
<tr>
<td>Primary</td>
<td>100</td>
<td>28.1</td>
<td>Yes</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Secondary</td>
<td>132</td>
<td>37.1</td>
<td>Stopped</td>
<td>4</td>
<td>1.1</td>
</tr>
<tr>
<td>Tertiary</td>
<td>34</td>
<td>9.6</td>
<td><strong>Time interval for review</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>23</td>
<td>6.5</td>
<td>Once every two weeks</td>
<td>2</td>
<td>8.1</td>
</tr>
<tr>
<td>Married</td>
<td>177</td>
<td>49.7</td>
<td>Once a month</td>
<td>241</td>
<td>67.7</td>
</tr>
<tr>
<td>Divorced</td>
<td>38</td>
<td>10.7</td>
<td>Once every two months</td>
<td>86</td>
<td>24.2</td>
</tr>
<tr>
<td>Widowed</td>
<td>118</td>
<td>33.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>356</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographic variable</td>
<td>Frequency N=356</td>
<td>Percentage %</td>
<td>Demographic variable</td>
<td>Frequency N=356</td>
<td>Percentage %</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------</td>
<td>---------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Length of diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>193</td>
<td>54.2</td>
<td>Once in every three months</td>
<td>20</td>
<td>5.6</td>
</tr>
<tr>
<td>6-10</td>
<td>120</td>
<td>33.7</td>
<td>&gt; three months</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>11-15</td>
<td>23</td>
<td>6.5</td>
<td>Time waits for clinical proceedings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16+</td>
<td>20</td>
<td>5.6</td>
<td>&lt; 30 mins</td>
<td>31</td>
<td>8.7</td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>6.7(6.6)</td>
<td></td>
<td>Within 2hrs</td>
<td>116</td>
<td>32.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Within 3hrs</td>
<td>138</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt; 3hrs</td>
<td>71</td>
<td>19.9</td>
</tr>
<tr>
<td>Hypertension status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td>44</td>
<td>12.4</td>
<td>Payment for medications/cost of treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>27</td>
<td>7.6</td>
<td>NHIS</td>
<td>230</td>
<td>64.6</td>
</tr>
<tr>
<td>Elevated</td>
<td>108</td>
<td>30.3</td>
<td>Private insurance</td>
<td>18</td>
<td>5.1</td>
</tr>
<tr>
<td>Stage 1</td>
<td>128</td>
<td>36</td>
<td>Out of pocket payment</td>
<td>93</td>
<td>26.1</td>
</tr>
<tr>
<td>Stage 2</td>
<td>49</td>
<td>13.8</td>
<td>Others</td>
<td>15</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Any eyes screened since your diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td></td>
<td></td>
<td>No</td>
<td>85</td>
<td>23.9</td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>132.8(15.9)</td>
<td></td>
<td>Yes</td>
<td>271</td>
<td>76.1</td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>78.2(10.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.2 showing test of association and Logistic regression, crude odds ratio and adjusted odds ratio of association between compliance level and independent variables of hypertensive patient in Ablekuma South Sub Metro

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low Adherence N=50</th>
<th>High Adherence N=306</th>
<th>Total N=356</th>
<th>Chi-square value</th>
<th>p-value</th>
<th>COR(95%CI) p-value</th>
<th>AOR(95%CI) p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>5(10.0)</td>
<td>7(2.3)</td>
<td>12(3.4)</td>
<td>13.89</td>
<td>0.016</td>
<td><strong>Ref</strong></td>
<td><strong>Ref</strong></td>
</tr>
<tr>
<td>40-49</td>
<td>2(4.0)</td>
<td>20(6.5)</td>
<td>22(6.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>14(28.0)</td>
<td>59(19.3)</td>
<td>73(20.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>21(42.0)</td>
<td>113(36.3)</td>
<td>134(37.6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70-79</td>
<td>7(14.0)</td>
<td>83(27.1)</td>
<td>90(25.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80+</td>
<td>1(2.0)</td>
<td>24(7.8)</td>
<td>25(7.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5(10.0)</td>
<td>55(18.0)</td>
<td>60(16.9)</td>
<td>2.18</td>
<td>0.14</td>
<td><strong>Ref</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>45(90.0)</td>
<td>251(82.0)</td>
<td>296(83.1)</td>
<td></td>
<td></td>
<td>0.51(0.19-1.34)</td>
<td>0.170</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>48(96.0)</td>
<td>289(94.0)</td>
<td>337(94.7)</td>
<td>0.842</td>
<td></td>
<td><strong>Ref</strong></td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>2(4.0)</td>
<td>14(4.6)</td>
<td>16(4.5)</td>
<td>0.04</td>
<td></td>
<td>1.16(0.26-5.28)</td>
<td>0.845</td>
</tr>
<tr>
<td>Other</td>
<td>0(0.0)</td>
<td>3(1.0)</td>
<td>3(0.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupational status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal sector</td>
<td>2(4.0)</td>
<td>13(4.2)</td>
<td>15(4.2)</td>
<td>2.26</td>
<td>0.324</td>
<td><strong>Ref</strong></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>26(52.0)</td>
<td>192(62.0)</td>
<td>218(61.2)</td>
<td></td>
<td></td>
<td>1.14(0.24-5.32)</td>
<td>0.871</td>
</tr>
<tr>
<td>Variable</td>
<td>Low Adherence N=50</td>
<td>High Adherence N=306</td>
<td>Total N=356</td>
<td>Chi-square value</td>
<td>p-value</td>
<td>COR (95% CI) p-value</td>
<td>AOR (95% CI) p-value</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>---------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Trader</td>
<td>22 (44.0)</td>
<td>101 (33.0)</td>
<td>123 (34.6)</td>
<td>0.71 (0.15-3.35)</td>
<td>0.662</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>15 (30.0)</td>
<td>75 (24.5)</td>
<td>90 (25.3)</td>
<td>4.35</td>
<td>0.226</td>
<td>0.31 (0.07-1.45)</td>
<td>1.37 (0.30-6.56)</td>
</tr>
<tr>
<td>Primary</td>
<td>11 (22.0)</td>
<td>89 (29.1)</td>
<td>100 (28.1)</td>
<td></td>
<td></td>
<td>0.51 (0.11-2.41)</td>
<td>0.39 (0.07-1.40)</td>
</tr>
<tr>
<td>Secondary</td>
<td>22 (44.0)</td>
<td>110 (35.0)</td>
<td>132 (37.1)</td>
<td></td>
<td></td>
<td>0.31 (0.07-1.40)</td>
<td>0.12 (0.03-0.38)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>2 (4.0)</td>
<td>32 (10.5)</td>
<td>34 (9.6)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td><strong>Antihypertensive pills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>48 (96.0)</td>
<td>289 (94.0)</td>
<td>337 (94.7)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>2 (4.0)</td>
<td>17 (5.6)</td>
<td>19 (5.3)</td>
<td></td>
<td></td>
<td>1.41 (0.32-6.31)</td>
<td>0.65 (0.28-1.54)</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>6 (12.0)</td>
<td>23 (7.5)</td>
<td>29 (8.1)</td>
<td>29.06</td>
<td>0.000</td>
<td>0.17 (0.05-0.55)</td>
<td>0.21 (0.05-0.84)</td>
</tr>
<tr>
<td>Once in a while</td>
<td>25 (50.0)</td>
<td>98 (32.0)</td>
<td>123 (34.6)</td>
<td></td>
<td></td>
<td>0.17 (0.07-0.42)</td>
<td>0.21 (0.08-0.58)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>12 (24.0)</td>
<td>27 (8.8)</td>
<td>39 (11.0)</td>
<td></td>
<td></td>
<td>0.10 (0.04-0.28)</td>
<td>0.10 (0.03-0.33)</td>
</tr>
<tr>
<td>Usually</td>
<td>7 (14.0)</td>
<td>158 (51.0)</td>
<td>165 (46.3)</td>
<td></td>
<td></td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>5 (10.0)</td>
<td>18 (5.9)</td>
<td>23 (6.5)</td>
<td>1.97</td>
<td>0.579</td>
<td>0.51 (0.17-1.51)</td>
<td>0.22 (0.05-1.25)</td>
</tr>
<tr>
<td>Married</td>
<td>22 (44.0)</td>
<td>155 (50.0)</td>
<td>177 (49.7)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>7 (14.0)</td>
<td>31 (10.1)</td>
<td>38 (10.7)</td>
<td></td>
<td></td>
<td>0.63 (0.25-1.59)</td>
<td>0.33 (0.07-1.53)</td>
</tr>
<tr>
<td>Widowed</td>
<td>16 (32.0)</td>
<td>102 (33.0)</td>
<td>118 (33.1)</td>
<td></td>
<td></td>
<td>0.90 (0.45-1.81)</td>
<td>0.77 (0.32-1.89)</td>
</tr>
<tr>
<td><strong>Length of diagnosis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>17 (34.0)</td>
<td>176 (57.0)</td>
<td>193 (54.2)</td>
<td>12.33</td>
<td>0.006</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>6-10</td>
<td>26 (52.0)</td>
<td>94 (30.7)</td>
<td>120 (33.7)</td>
<td></td>
<td></td>
<td>0.35 (0.18-0.68)</td>
<td>0.002 (0.14-1.45)</td>
</tr>
<tr>
<td>11-15</td>
<td>2 (4.0)</td>
<td>21 (6.9)</td>
<td>23 (6.5)</td>
<td></td>
<td></td>
<td>1.01 (0.22-4.69)</td>
<td>0.98 (0.26-3.59)</td>
</tr>
<tr>
<td>Variable</td>
<td>Low Adherence N=50</td>
<td>High Adherence N=306</td>
<td>Total N=356</td>
<td>Chi-square value</td>
<td>p-value</td>
<td>COR(95%C.I) p-value</td>
<td>AOR(95%C.I) p-value</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>------------------</td>
<td>---------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>16+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any chronic condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease</td>
<td>2(4.0)</td>
<td>1(0.3)</td>
<td>3(0.8)</td>
<td>7.07</td>
<td>0.069</td>
<td>0.07(0.01-0.83)</td>
<td>0.031</td>
</tr>
<tr>
<td>Diabetes</td>
<td>4(8.0)</td>
<td>11(3.6)</td>
<td>15(4.2)</td>
<td></td>
<td></td>
<td>0.41(0.12-1.33)</td>
<td>0.137</td>
</tr>
<tr>
<td>Stroke</td>
<td>1(2.0)</td>
<td>2(0.7)</td>
<td>3(0.8)</td>
<td></td>
<td></td>
<td>0.30(0.03-3.33)</td>
<td>0.324</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>0(0.0)</td>
<td>1(0.3)</td>
<td>1(0.3)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>43(86.0)</td>
<td>291(95.)</td>
<td>334(93.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time interval for review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once every two weeks</td>
<td>1(2.0)</td>
<td>6(2.0)</td>
<td>7(2.0)</td>
<td>4.87</td>
<td>0.182</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td>37(74.0)</td>
<td>204(66.)</td>
<td>241(67.7)</td>
<td></td>
<td></td>
<td>0.92(0.11-7.86)</td>
<td>0.938</td>
</tr>
<tr>
<td>Once every two months</td>
<td>7(14.0)</td>
<td>79(25.8)</td>
<td>86(24.2)</td>
<td></td>
<td></td>
<td>1.88(0.19-17.91)</td>
<td>0.583</td>
</tr>
<tr>
<td>Once in every three months</td>
<td>5(10.0)</td>
<td>15(4.9)</td>
<td>20(5.6)</td>
<td></td>
<td></td>
<td>0.5(0.05-5.22)</td>
<td>0.563</td>
</tr>
<tr>
<td>&gt; three months</td>
<td>0(0.0)</td>
<td>2(0.7)</td>
<td>2(0.6)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Type of payment for medication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHIS</td>
<td>29(58.0)</td>
<td>201(65.)</td>
<td>230(64.6)</td>
<td>3.43</td>
<td>0.329</td>
<td>2.45(0.31-19.13)</td>
<td>0.392</td>
</tr>
<tr>
<td>Private Insurance</td>
<td>1(2.0)</td>
<td>17(5.6)</td>
<td>18(5.1)</td>
<td></td>
<td></td>
<td>0.65(0.34-1.24)</td>
<td>0.189</td>
</tr>
<tr>
<td>Out of pocket payment</td>
<td>17(34.0)</td>
<td>76(24.8)</td>
<td>93(26.1)</td>
<td></td>
<td></td>
<td>0.58(0.15-2.16)</td>
<td>0.416</td>
</tr>
<tr>
<td>Others</td>
<td>3(6.0)</td>
<td>12(3.9)</td>
<td>15(4.2)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Hypertension status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td>13(26.0)</td>
<td>31(10.1)</td>
<td>44(12.4)</td>
<td>13.30</td>
<td>0.009</td>
<td>0.10(0.01-0.75)</td>
<td>0.026</td>
</tr>
<tr>
<td>Normal</td>
<td>1(2.0)</td>
<td>26(8.5)</td>
<td>27(7.6)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Elevated</td>
<td>10(20.0)</td>
<td>98(32.0)</td>
<td>108(30.3)</td>
<td></td>
<td></td>
<td>0.38(0.05-3.08)</td>
<td>0.363</td>
</tr>
<tr>
<td>Stage 1</td>
<td>17(34.0)</td>
<td>111(36.)</td>
<td>128(36.0)</td>
<td></td>
<td></td>
<td>0.25(0.03-1.97)</td>
<td>0.189</td>
</tr>
<tr>
<td>Stage 2</td>
<td>9(18.0)</td>
<td>40(13.1)</td>
<td>49(13.8)</td>
<td></td>
<td></td>
<td>0.17(0.02-1.43)</td>
<td>0.103</td>
</tr>
<tr>
<td>Waiting time for consultation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

University of Ghana http://ugspace.ug.edu.gh
<table>
<thead>
<tr>
<th>Variable</th>
<th>Low Adherence (N=50)</th>
<th>High Adherence (N=306)</th>
<th>Total (N=356)</th>
<th>Chi-square value</th>
<th>p-value</th>
<th>COR(95%C.I)</th>
<th>p-value</th>
<th>AOR(95%C.I)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 min</td>
<td>9(18.0)</td>
<td>22(7.2)</td>
<td>31(8.7)</td>
<td>20.36</td>
<td>0.000</td>
<td>Ref</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 2hrs</td>
<td>5(10.0)</td>
<td>111(36.)</td>
<td>116(32.5)</td>
<td>9.09(2.77-</td>
<td>0.000</td>
<td>6.86(1.68-</td>
<td>0.007</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29.71)0.000</td>
<td></td>
<td>27.91)0.007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 3hrs</td>
<td>20(40.0)</td>
<td>118(38.)</td>
<td>138(38.8)</td>
<td>2.41(0.97-</td>
<td>0.057</td>
<td>3.77(1.16-</td>
<td>0.026</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.98)0.057</td>
<td></td>
<td>27.91)0.026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;3hrs</td>
<td>16(32.0)</td>
<td>55(18.0)</td>
<td>71(20.0)</td>
<td>1.40(0.54-</td>
<td>0.484</td>
<td>1.41(0.41-</td>
<td>0.583</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.65)0.484</td>
<td></td>
<td>4.89)0.583</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level of illness perception</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>22(44.0)</td>
<td>130(42.)</td>
<td>152(42.7)</td>
<td>0.04</td>
<td>0.841</td>
<td>0.94(0.51-</td>
<td>0.841</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.72)</td>
<td></td>
<td>0.841</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>28(46.0)</td>
<td>176(57.)</td>
<td>204(57.3)</td>
<td>Ref</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results from table 4.2 shows significant association between age and compliance. The odds of compliance increases with increasing age, for instance age group 80 years or more have 21.17 times odds of adhering to therapy than their younger counterparts. Shown in table 4.2 is also a significant association between involvement in physical exercise and compliance on therapy, respondents who had no physical exercise have about 79% (AOR :0.21 CI:0.05-0.84) reduced odds to comply than those who had usual physical activity. Similarly there is a significant association between length of patient diagnosis and compliance on therapy, as the duration increases there is reduced odds of compliance to therapy, for instance patients whose diagnosis were more than 16 years have 56% (AOR:0.44,CI:0.89-2.12) reduced odds of compliance than those within 1-5 years. Also the category of patients blood pressure has an association with compliance, as noted from table 4.2 as the category of blood pressure worsens, stage 2 hypertensive have 89% (AOR:0.11,CI:0.01-0.97) reduced odds to comply than normotensives. Lastly, there is a significant association between patient waiting time and compliance, the longer the waiting time the less odds of compliance to therapy, patients who waited more than 3 hours
had 41% times (AOR:1.41 CI:0.41-4.89) odds to comply compared to those who waited 2 hours
58% times (AOR:6.86 CI:1.68-27.91) less than 30 minutes at the clinics.
Table 4.3 Logistic regression showing crude odd ratio of association between sometimes forgetting to take medication and age demographic characteristic of hypertensive patient in ablekuma south sub metro

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
<th>Chi</th>
<th>p-value</th>
<th>COR(95%C.I)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=321</td>
<td>N=35</td>
<td>N=356</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>7(2.2)</td>
<td>5(14.3)</td>
<td>12(3.4)</td>
<td></td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>21(6.5)</td>
<td>1(2.8)</td>
<td>22(6.2)</td>
<td>21.17</td>
<td>0.001</td>
<td>0.07(0.01-0.67)</td>
<td>0.002</td>
</tr>
<tr>
<td>50-59</td>
<td>63(19.6)</td>
<td>10(28.6)</td>
<td>73(20.5)</td>
<td></td>
<td></td>
<td>0.22(0.06-0.84)</td>
<td>0.026</td>
</tr>
<tr>
<td>60-69</td>
<td>119(37.1)</td>
<td>15(42.9)</td>
<td>134(37.6)</td>
<td></td>
<td></td>
<td>0.17(0.05-0.63)</td>
<td>0.007</td>
</tr>
<tr>
<td>70-79</td>
<td>87(27.1)</td>
<td>3(8.6)</td>
<td>90(25.3)</td>
<td></td>
<td></td>
<td>0.06(0.01-0.59)</td>
<td>0.016</td>
</tr>
<tr>
<td>80+</td>
<td>24(7.5)</td>
<td>1(2.8)</td>
<td>25(7.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An analysis of the association between those who forget to take their medications and their age shows that there is a statitical significance at p-value of 0.00. The odds of forgetting to take medications are less likely in all age groups but greater in those 70-79 years 0.05(0.01-0.25) and 80+ years 0.06(0.01-0.59). Hence younger patients are more likely to forget to take medications than older patients, and that is consistent with the increased odd adherence found among the older age group than those less than 40 years.
Figure 4.1 Overall difference of levels of illness perception and compliance of medication adherence among hypertensive patient in Ablekuma South Sub Metro. Error bars represent confidence intervals.

The results show that 86% of total respondents have good medication adherence, compared to just about 14% with low adherence that is a MMA-8 score of more than 2.
Figure 4.2 Sex difference association of compliance level of medication adherence among hypertensive patient in Ablekuma South Sub Metro. Error bars represent confidence intervals.
CHAPTER FIVE

DISCUSSION

5.1 COMPLIANCE ON THERAPY

Hypertension like other chronic diseases involves long-term management. Compliance with therapy is a key component to management and desired outcomes. Compliance is defined as the “practice of obeying rules or requests made by people in authority” (Oxford Advanced Learner’s Dictionary of Current English). Compliance in healthcare is said to be the extent to which patients’ behaviours (in terms of taking medication, following diets or executing lifestyle changes) coincide with healthcare providers’ recommendations for health and medical advice (Haynes et al., 1976; À Sever & Messerli, 2011).

This research found that about 86% of respondents had good medication adherence that is an MMA-8 scale score of 2 or less, which was used as a proxy measure of patient compliance in general terms in this study. This is significantly high than a similar study which was done by Botchway in 2014 which revealed a compliance rate of about 32.6% but close to the results realized by Sebate in 2003, which estimated compliance on anti-hypertensive medications between 50-70% and however the compliance was less likely as the respondents years of diagnosis increase. It is possible that the clinicians even though are over whelmed by the clinic numbers seems to be doing well in terms of health promotion and education, hence this level of compliance or it could just be the fact, this is expected because any non-compliant patient might not even attend clinics to get interviewed in this study, so we might be having a true picture.
None the less to have a patient population who are able to take their medications and come for clinic visits is a good start for controlling non-communicable diseases.

The common forms of non-compliance encountered in medical therapy as stated by Jin et al. (2008) include, not purchasing medications, incorrect doses, wrong timing of dosing, stopping the treatment too soon, non-participation in clinic visits, and having drug holidays. This study found about 14% of respondents not complying with therapy medication adherence and mostly either forgot to take their medications, or travelling and leaving their medications at home or even miss their medications for other reasons than forgetting largely some not able to do routine monitoring laboratory test because of finances. The findings in this study are not in any way consistent with other studies which had found about 30-50% of hypertensive patients withdrawing from their medications and another 33% not adhering to the dose regimen at all. (Rosalie and Stephanie, 2002).

5.2 Compliance on dietary modification and exercise

To add this study had about 46.3% of respondents having regular exercise as part of the management of hypertension, while some 41.3% have some dietary modification in terms of sodium intake and another 25.3% made some modification in terms of saturated fat consumption, with about 33% not making any efforts of modifying their diet, however, literature showed therapeutic compliance for lifestyle change is lowest at about 20-30 percent. (Dimatteo 1995).

5.3 Patient factors and compliance (medication adherence)

Age

This study found positive significance association between patient age and medication adherence which as used as a proxy of compliance in this study and even more so the odds of adherence
was more for the older age group which is consistent with some literature reviewed (Norman et al 1985; Didlake et al 1988; Schweizer et al 1990; Shea et al 1992; Monane et al 1996; Buck et al 1997; Viller et al 1999; Sirey et al 2001; Kim et al 2002; Senior et al 2004; Hertz et al 2005). However, it must be stated that some other studies did find increasing age affecting compliance negatively (Okuno et al. 1999; Benner et al. 2002; Balbay et al. 2005) with the explanations that they might have visual problems, hearing and memory impairments as confounding factors. On the contrary and as revealed by this study, older patients might be more concerned about their conditions than younger patients hence their level of non-adherence turn to be unintentional in most cases as far they can have good social support, it is possible that in a typical African society because of our family systems, there might be good family support and reminders to older patients to take medications, which might explain the findings of medication adherence and increasing age in this study.

As is evident from this study the odds (AOR) for 40-49 years was 7.14 times more compared to 70-79 years (8.47 times and 80 years or more with odds of 17.14 times more to adhere to medications and consistent with other studies compliance rates among under 40 years were found low, a study in Japan, found patients in the prime of their life (40–59 years) less likely to be compliant to the medication theory (Iihara et al 2004). Similarly, young patients under 40 years were also found to have a low compliance rate (Neeleman and Mikhail 1997; Leggat et al. 1998; Loong 1999; Siegal and Greenstein 1999).

**Sex**

Though there was no statistical significance between patient sex and medication adherence in this study, it might not be surprising as literature has demonstrated enough controversy with this
factor and compliance in the past. Some studies found female patients to have better compliance (Degoulet et al 1983; Chuah 1991; Shea et al 1992; Kyngas and Lahdenpera 1999; Viller et al 1999; Kiortsis et al 2000; Lindberg et al 2001; Balbay et al 2005; Choi-Kwon 2005; Fodoret al 2005; Lertmaharit et al 2005), while other studies found that male patients were more compliant (Frazier et al 1994; Sung et al 1998; Caspard et al 2005; Hertz et al 2005). Some other studies could not find a relationship between patient sex and compliance (Menzies et al. 1993; Buck et al. 1997; Horne and Weinman 1999; Ghods and Nasrollahzadeh 2003; Spikmans et al. 2003; Senior et al. 2004) as is the case in this study, however, the odds of adherence was less likely in females (0.51 ) times than males.

**Educational level**

This study did not find any significant association of educational level with medication adherence. Jin et al. (2008) had concluded that education and its effect on compliance is equivocal after reviewing about 13 articles on the subject, the results in this study is consistent with others that found no relationship (Norman et al 1985; Horne and Weinman 1999; Spikmans et al 2003; Kaona et al 2004; Stilley et al 2004; Wai et al 2005) it may be expected that patients with higher educational level should have better knowledge about the disease and therapy and therefore be more compliant, but DiMatteo, (1995), found that even highly educated patients may not understand their conditions or believe in the benefits of being compliant with their medication. It is worth noting the crude odds of adhering was 0.31 times less in patients with no education than those with tertiary education.
Marital status

Marital status was found not to be significant with medication adherence in this study like other studies had revealed (Ghods and Nasrollahzadeh 2003; Spikmans et al. 2003; Kaona et al. 2004; Wild et al. 2004; Yavuz et al. 2004). Contrary to other studies that found some significant relationship between marital status and compliance arguing that, support from a spouse may be the difference than in single patients (Swett and Noones 1989; Frazier et al. 1994; De Geest et al. 1995; Turner et al. 1995; Cooper et al. 2005). Though not statistically significant in this single study patients were 0.51 times less likely to adhere than married patients.

Perception of disease

It is a well-noted fact that patients with good illness perception are more likely to adhere to therapy as per the review of the literature by Jin et al., (2008), of some 23 articles. Results from the various studies, showed that compliance was better when the patient had the following beliefs: the patient feels susceptible to the disease or its complication (Haynes et al. 1980; Abbott et al. 1996; Spikmans et al. 2003), the patient/client believes that the illness or its complications could pose severe consequences for his health (McLane et al. 1995; Sirey et al. 2001; Loffler et al. 2003), the patient/client believes that the therapy will be effective or perceives benefits from the therapy (Lorenc and Branthwaite 1993; De Geest et al 1995; Cochrane et al1999; Horne and Weinman 1999; Apter et al 2003; Spikmans et al 2003; Krousel-Wood et al 2004; Wild et al 2004; Gonzalez et al 2005; Seo and Min 2005).

From this study patients, the perception was not found to be significantly associated with medication adherence. However, the odds of adherence for those with average perception was 0.94(0.51-1.72) times less likely to adhere than those with good perception.
Smoking and alcohol / physical activity

In Finland, a study among patients with hypertension, found those who did not smoke were more compliant in terms of diet restrictions than those who smoked (Kyngas and Lahdenpera 1999), however, results from this study did not show any statistical significance between non-smoking/non-alcohol consumption and medication adherence like in other studies though the vast majority over 90% were both non-smokers and non-drinkers.

To add is the fact that there was a significant negative relationship between patient who has regular physical exercise and medication adherence implying that patients adhered less with physical activity, it is realized that patient who never had any form of physical activity the odds (AOR - 0.17 times) less to comply on medication than those who had regular exercise.

5.4 Health system factors

This study found a significant association between patient waiting time (more than 3 hours 38.8% majority) and medication adherence p-value (0.000) which is consistent with other studies showing longer clinic visit hours (Grunebaum et al 1996; Balkrishnan et al 2003; Moore et al 2004; Lawson et al 2005; Wai et al 2005), contributing to poor compliance in chronic disease patients, especially, those on insurance (though in this study most of the patients were on NHIS (64.6%), it was not significant with medication adherence on its own), as medications are only supposed to be prescribed for a specific period, and hence regular visits are required, which is precisely the reason for about 67.7% of respondents having monthly review dates.

Similarly, the study revealed a significant negative association between patient length of diagnosis and adherence on medication p-0.006. However, the odds of medication adherence are not different within the various groups of the length of diagnosis. Meaning that as the patient's
length of diagnosis increase they adhere to medication therapy less than those who were diagnosed within a short period, it is postulated that the longer the patient takes the medications, the possibility of becoming non-compliant is even more.

5.5 Socio-economic factors

It is a well-documented fact in the literature that cost of treatment in terms of medications purchasing power is key in compliance most especially for those with chronic illness because of lifelong treatments (Ellis et al. 2004; Ponnusankar et al. 2004). Similar studies realized that clients with no insurance cover (Kaplan et al. 2004; Choi-Kwon 2005), or with low income (Apter et al. 1998; Berghofer et al. 2002; Benner et al. 2002; Ghods and Nasrollahzadeh 2003; Hernandez-Ronquillo et al. 2003; Mishra et al. 2005) were more likely to be non-compliant to treatment, it must be stated that in this study respondents income levels were not easily attained and hence was not part of the results, however, respondents modality of payment for medications were well documented in this study with a greater majority using (NHIS) and a few on private insurance but no statistical significance was noted with payment modality and medication adherence, but it must be stated that the odds of adherence on NHIS are 2.45 times more than other forms of payment and even about 0.58 times less to medication adherence seen in out of pocket payment group.

5.6 Therapy/disease-related factors

This study did not find any relationship between factors like the number of pills taken by patient, however, the blood category status of the respondents were negatively associated with adherence, it is noted from results that about 36% of respondents blood pressure was in the range of stage 1 hypertension (between 130/80-139/89mmhg), the odds (AOR) shows that the stage 2 hypertensive blood category were 0.11 times less likely to adhere to medication than those with
normal blood pressure, like those in stage 1 who were 0.13 times less likely to adhere than those with normal blood pressure. This association implies that as the person’s blood pressure goes up from normal, they are even less likely to adhere to medications, suggesting that poor blood pressure control worsens medication adherence more than it improves. It is postulated that uncontrolled blood pressure alone might not just be a reason for lesser medication adherence but other confounders that influence adherence might play a role.

5.7 Limitations

This study was limited by the inability to estimate respondents' income levels, hence this factor was not included in the final analysis.
CHAPTER SIX

6.1 CONCLUSIONS

In conclusions, respondents had good compliance on therapy with a proxy measure as medication adherence of about 86%.

Older patients seemed to comply better than the younger patients, similarly involvement in Physical exercise increases the odds of compliance in patients than those who do not exercise. As the Length of patient diagnosis increases the compliance odds reduces rather, uncontrolled /high blood pressure was associated with poor compliance in this study. Lastly, as patient waiting time increased the odds of compliance to therapy also reduces. The proportion of respondents who had regular physical exercise as part of hypertension management, changes to saturated fat consumption and sodium restriction in their diet was less than 50%. The adherence was greater for respondents in older age groups than less than 40 years and also older patients were less likely to forget to take medications compared to younger patients, with no difference in adherence between males and females at 95% confidence interval.

This study did not find any significant association between medication purchasing modalities, time interval for review, comorbidity, marital status, educational level, occupation and sex of respondents with medication adherence /compliance.
6.2 RECOMMENDATIONS

FURTHER RESEARCH
-On patient income levels and therapeutic compliance.
-On medication side effects and therapeutic compliance.
-On time constraints/work schedule on medication adherence/compliance.

FOR CLINICAL /PUBLIC HEALTH PRACTICE
- For service providers/administrators to improve infrastructural and human resource limitations to reduce patients waiting times at the clinics by having smaller clinic numbers.
- Physician to continue to advocate for patients up take of dietary modification and exercise as part of management of hypertension.
- Deploy new innovations like having medication refill clinics and time to avoid the long waiting time currently seen.

POLICY MAKERS
- Routine monitoring laboratory test should become part of the health insurance coverage for hypertensive and other chronic disease patients.
- To revise the insurance policy on writing prescription only on monthly basis especially for chronic disease persons so as to reduce the frequency of visits for those with controlled blood pressure and also minimise the numbers at the clinics monthly.
REFERENCES


56


Appendix 1

Questionnaires

Dear Participant,

My name is Ayanore Augustine Adoliba, a student of the School of Public Health, University of Ghana, undertaking a study on the above topic in partial fulfillment of my master’s in public health.

The objective of this study is to determine the factors that affect therapeutic compliance of hypertension patients, this could be used as a model by health professional in addressing the many challenges that comes with compliance especially with chronic diseases like hypertension, so as to reduce the increasing morbidities and complications, as well as financial implications of non-compliance in the general population.

The information you will provide will be vital to establishing the objectives of this study and you are assured that your information will be treated with the uttermost confidentiality.

Your written consent in a form of your signature is required before the questionnaire can be administered, for any participant who can’t sign for any reason a thumbprint option is available in the presence of a credible witness.

Participation in this study is voluntary and you can choose to partake, you are at liberty to withdraw from the study at any time, however your participation and cooperation is encouraged since it’s vital for the study.

Clients Consent Form

I………………………………………………………….. declare that the purpose, procedures as well as risk and benefits of this study have thoroughly explained to me and I have agreed to take part in this study.

Signature of participant ........................................Date

………………………………………………..Or

Thumbprint (participant)................................. Witness
Signature..............................................

Declaration by witness

I ................................................................. Declares that I have willingly witnessed the participation of the above named in this research.

Signature of interviewer................................. Date .........................
<table>
<thead>
<tr>
<th>Part A: Patient Bio-demographic data:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age of respondent: ………………………….</td>
<td>6. Average Monthly Income …………..</td>
</tr>
<tr>
<td>2. Sex of respondent</td>
<td></td>
</tr>
<tr>
<td>(a) ( ) Male</td>
<td>7. How many Antihypertensive pills are you currently taking: ……………….</td>
</tr>
<tr>
<td>(b) ( ) Female</td>
<td></td>
</tr>
<tr>
<td>3. Religion of respondent</td>
<td></td>
</tr>
<tr>
<td>( a) ( ) Christian</td>
<td>8. Last BP check: ……………………..</td>
</tr>
<tr>
<td>( b) ( ) Muslim</td>
<td></td>
</tr>
<tr>
<td>( c) ( ) Traditional</td>
<td>9. Physical Activity</td>
</tr>
<tr>
<td>( d) ( ) Other</td>
<td>(a) ( ) Never</td>
</tr>
<tr>
<td>4 Occupational Status</td>
<td>(b) ( ) Once in a while</td>
</tr>
<tr>
<td>( a) ( ) Formal sector</td>
<td>(c) ( ) Sometimes</td>
</tr>
<tr>
<td>( b) ( ) Unemployed</td>
<td>(d) ( ) Usually</td>
</tr>
<tr>
<td>( c) ( ) Retired</td>
<td>( e) ( ) All the time</td>
</tr>
<tr>
<td>( d) ( ) Trader</td>
<td></td>
</tr>
<tr>
<td>( e) ( ) Farmer</td>
<td></td>
</tr>
<tr>
<td>( f) ( ) Business person</td>
<td></td>
</tr>
<tr>
<td>5. Educational level</td>
<td>10. Marital Status</td>
</tr>
<tr>
<td>( a) ( ) None</td>
<td>( a) ( ) Never</td>
</tr>
<tr>
<td>( b) ( ) Primary</td>
<td>( b) ( ) Married</td>
</tr>
<tr>
<td>( c) ( ) Secondary</td>
<td>( c) ( ) Divorced</td>
</tr>
<tr>
<td>(c) ( ) Tertiary</td>
<td>(d) ( ) Widowed</td>
</tr>
<tr>
<td>6. Average Monthly Income</td>
<td></td>
</tr>
<tr>
<td>7. How many Antihypertensive pills are you currently taking: ……………….</td>
<td></td>
</tr>
<tr>
<td>8. Last BP check: ……………………..</td>
<td></td>
</tr>
<tr>
<td>9. Physical Activity</td>
<td></td>
</tr>
<tr>
<td>( a) ( ) Never</td>
<td></td>
</tr>
<tr>
<td>(b) ( ) Once in a while</td>
<td></td>
</tr>
<tr>
<td>(c) ( ) Sometimes</td>
<td></td>
</tr>
<tr>
<td>(d) ( ) Usually</td>
<td></td>
</tr>
<tr>
<td>( e) ( ) All the time</td>
<td></td>
</tr>
<tr>
<td>10. Marital Status</td>
<td></td>
</tr>
<tr>
<td>( a) ( ) Never</td>
<td></td>
</tr>
<tr>
<td>( b) ( ) Married</td>
<td></td>
</tr>
<tr>
<td>( c) ( ) Divorced</td>
<td></td>
</tr>
<tr>
<td>(d) ( ) Widowed</td>
<td></td>
</tr>
<tr>
<td>11. Length of Diagnosis (in years)?</td>
<td></td>
</tr>
<tr>
<td>12. Dietary habits</td>
<td></td>
</tr>
<tr>
<td>(a) ( ) Low sodium</td>
<td></td>
</tr>
<tr>
<td>(b) ( ) Low saturated fats</td>
<td></td>
</tr>
<tr>
<td>(c) ( ) No change</td>
<td></td>
</tr>
</tbody>
</table>
### 13. Do you have any chronic disease?

a) ( ) Cancer  
b) ( ) Heart disease  
c) ( ) Diabetes  
d) ( ) Stroke  
e) ( ) Chronic Kidney disease  
f) ( ) Others

15 Do you Drink Alcohol

a) ( ) Yes  
b) ( ) No  
c) ( ) Stopped

### 16. Do you smoke?

a) ( ) Yes  
b) ( ) No  
c) ( ) Stopped

17. How often do you come for your review?

a) ( ) once every two weeks?  
b) ( ) once a month?  
c) ( ) once every two months?  
d) ( ) once in every three months?  
e) ( ) > three months?

### 18. How long do you wait at the clinic before being attended to?

a) ( ) < 30 mins?  
b) ( ) within 1hr?  
c) ( ) within 3hrs?  
d) ( ) > 3hrs?

19. How do you pay for your medications/cost of treatment?

a) ( ) NHIS?  
b) ( ) Private insurance?  
c) ( ) out of pocket payment?  
d) ( ) others

### 20. Have you had your eyes screened since your diagnosis?

Yes ( )  No ( )

21. If NO, why?

a) ( ) I am not aware of it?  
b) ( ) I have no access to eye screening services?  
c) ( ) I have no money for such services?  
d) ( ) others?

### 22. Do you do all lab test requested by your doctor?

Yes ( )  No ( )

If NO, why?

..........................

### Part B: Patient illness Perceptions Scale
Please circle the number which best corresponds to your views.

<table>
<thead>
<tr>
<th>Component</th>
<th>1 = Strongly disagree</th>
<th>2 = Disagree</th>
<th>3 = Neutral</th>
<th>4 = Agree</th>
<th>5 = Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identity</td>
<td>I feel better when I take Antihypertensive drugs.</td>
<td>1…2…3…4…5…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Consequence</td>
<td>Antihypertensive drugs will improve my life</td>
<td>1…2…3…4…5…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cure-control</td>
<td>Antihypertensive drugs will control my blood pressure</td>
<td>1…2…3…4…5…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-efficacy</td>
<td>I have control over my illness</td>
<td>1…2…3…4…5…</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Score:

Part c: Morisky 8-item Medication Adherence Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Patient Answer</th>
<th>Score (Y=1, N=0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you sometimes forget to take your medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?

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

5. Did you take all your medicines yesterday?

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

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

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

(A = 0 B-E = 1)

Scores: >2 = low adherence
1 or 2 = medium adherence
0 = high adherence

Options:
A. Never/rarely
B. Once in a while
C. Sometimes
D. Usually
E. All the time