FACTORS INFLUENCING ADHERENCE TO ORAL ANTIHYPERTENSIVE MEDICATION AMONGST PATIENTS ATTENDING THE KORLE-BU TEACHING HOSPITAL

BY

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JULY 2013
DECLARATION

I declare that except for references to other people’s investigations which have been duly acknowledged, this dissertation is the result of my own research and that this dissertation either in whole or part has not been presented for another degree elsewhere.

NAME OF STUDENT: JENNIFER GERTRUDE LARYEA

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JULY 2013

NAME OF ACADEMIC SUPERVISOR: DR PRISCILLIA NORTEY

SIGNATURE:.................................................................

JULY 2013
DEDICATION

Dedicated to my husband,

Vincent

and my precious angels

Jayden, Vinelle Mandy and Arielle Shelby.

I will lift up my eyes unto the hills from whence cometh my help.

Psalm 121:1
ACKNOWLEDGEMENTS

I give thanks to the Almighty God who has been faithful to me.

I express heartfelt gratitude to my supervisor Dr Priscillia Nortey for her support, guidance and encouragement. My sincere appreciation also goes to all the lecturers at Epidemiology and Disease Control for your immense support.

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A loving thank you I give to my husband Mr. Vincent Daniel Laryea for his never ending love, emotional support, encouragement, patience and prayers during this endeavour and my children for their unconditional love and understanding.

Special thanks to my parents Dr and Mrs. Coke for believing in me and keeping me lifted up in prayer.

To all the patients who participated in my study I offer kind regards and blessings for their willingness to participate in my study.

I thank all my family and friends for their prayers and moral support especially Francisca Zigah, Sulias Bruce, Benjamin Amanya and Franklin Acheampong.

To all who in anyway knowingly or unknowingly helped and inspired me to work hard and succeed I say thank you.
TABLE OF CONTENTS

DECLARATION ................................................................................................................ ii
DEDICATION ................................................................................................................... iii
ACKNOWLEDGEMENTS ............................................................................................... iv
TABLE OF CONTENTS ..................................................................................................... v
LIST OF FIGURES ........................................................................................................... ix
LIST OF ACRONYMS ....................................................................................................... x
ABSTRACT ....................................................................................................................... xi
CHAPTER ONE ..................................................................................................................1
  1.0  INTRODUCTION ....................................................................................................1
  1.1  Background ...........................................................................................................1
  1.2  Statement of the Problem ......................................................................................4
  1.3  Conceptual Framework ........................................................................................6
  1.4  Justification ..........................................................................................................6
  1.5  OBJECTIVES .......................................................................................................7
      1.5.1  General Objective ....................................................................................... 7
      1.5.2  Specific Objectives ...................................................................................... 7
  2.0  LITERATURE REVIEW ......................................................................................... 8
  2.1.  HYPERTENSION .................................................................................................. 8
      2.1.1.  Classification of hypertension ................................................................. 8
      2.1.2.  Causes of Hypertension ............................................................................ 9
      2.1.3.  Epidemiology of Hypertension ................................................................ 10
      2.1.4.  Hypertension as a public health problem .............................................. 11
2.1.5. Risk Factors for Hypertension ................................................................. 13
2.1.6. Management of hypertension ................................................................. 15
2.1.7. Complications of hypertension ............................................................... 19
2.2. Adherence .........................................................................................................20
  2.2.1. Adherence to hypertension treatment ..................................................... 21
  2.2.2. Factors affecting adherence ..................................................................... 22
  2.2.3. Measurement of adherence ...................................................................... 26
2.3. Non Prescribed Medication ........................................................................ 31
2.4. Health Belief Model .................................................................................... 32

CHAPTER THREE ...........................................................................................................34
3.0 METHODS .............................................................................................................34
  3.1 Type of study .................................................................................................... 34
  3.2 Study Area ....................................................................................................... 34
  3.3 Study Population ............................................................................................. 35
  3.4 Sampling ........................................................................................................... 35
    3.4.1 Sample size ................................................................................................ 35
    3.4.2 Sampling method ..................................................................................... 36
  3.5 Data Collection Techniques/Methods & Tools .............................................. 36
  3.6 Quality control ............................................................................................... 37
  3.7 Data Processing and Analysis ....................................................................... 38
  3.8 Ethical consideration ...................................................................................... 39
  3.9 Pilot Study ....................................................................................................... 40

CHAPTER 4 ......................................................................................................................41
4.0 RESULTS .................................................................................................................41
  4.1 Demographic and Socio-economic characteristics of respondents ............... 41
LIST OF TABLES

Table 2-1: Classification of Hypertension.........................................................8
Table 2-2: Lifestyle Modifications to Prevent and Manage Hypertension...............17
Table 2-3: Methods for measuring adherence.....................................................27
Table 4-1: Patients demographic and socioeconomic characteristics...................42
Table 4-2: Patients knowledge on hypertension and its treatment........................45
Table 4-3: Patients response to motivational factors and quality of care...............46
Table 4-4: The Morisky Medication Adherence Scale showing patients response.....47
Table 4-5: Comparison of socio-demographic factors of patients with adherence....50
Table 4-6: Comparison of patients variables with adherence...............................52
Table 4-7: Factors associated with adherence to antihypertensive drugs..............55
LIST OF FIGURES

Figure 1: Conceptual framework ........................................................................................ 6
Figure 2: Respondents adherence score............................................................................48
Figure 3: Adherence levels...............................................................................................48
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLHAT</td>
<td>The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial</td>
</tr>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>DASH</td>
<td>Dietary Approaches to Stop Hypertension</td>
</tr>
<tr>
<td>DBP</td>
<td>Diastolic Blood Pressure</td>
</tr>
<tr>
<td>HBM</td>
<td>Health belief model</td>
</tr>
<tr>
<td>KBTH</td>
<td>Korle-Bu Teaching Hospital</td>
</tr>
<tr>
<td>MMAS</td>
<td>Moriskys Medication Adherence Scale</td>
</tr>
<tr>
<td>NHIS</td>
<td>National Health Insurance Scheme</td>
</tr>
<tr>
<td>NSAIDS</td>
<td>Non Steroidal Anti-Inflammatory Drugs</td>
</tr>
<tr>
<td>OPD</td>
<td>Out Patient Department</td>
</tr>
<tr>
<td>SBP</td>
<td>Systolic Blood Pressure</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Sahara Africa</td>
</tr>
<tr>
<td>TOHP</td>
<td>Trials of hypertension prevention</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
ABSTRACT

Introduction: Medication adherence is an integral component in the management of hypertension. Poor adherence to medications is one of the major public health challenges. Sub optimal adherence to antihypertensive medication is a major risk factor for many cardiovascular diseases. Good medication adherence would ensure adequate blood control and therefore reduce cardiovascular morbidity and mortality.

The objective was to measure adherence levels amongst hypertensive patients and to determine factors influencing their adherence to antihypertensive medications.

Method: A cross sectional study was conducted at the O.P.D of the Korle Bu Teaching Hospital in Accra amongst 413 hypertensive patients aged 18 years and above. The Morisky Medication Adherence Scale (MMAS-8) was used to determine the levels of adherence. Good adherence was defined as MMAS scores of 6 and more out of a total score of 8.

Results: Overall, 197(47.7%) patients had good adherence to antihypertensive medication. After multivariate adjustment marital status was the most significant; compared with the singles the adjusted odds for the divorced was lower, OR 0.19 (95%CI, 0.06 – 0.65). Additionally being a professional, earning a monthly income of ₦601 and above, duration of 5 to 10 years hypertension, presence of side effects, taking more antihypertensive tablets daily, and unacceptable waiting time at the clinic were all associated with poor adherence.

Conclusion: There is an overall poor adherence rate of 52.3% among adult hypertensive users at KBTH. This prompts the need for continuous health education especially
amongst new hypertensive patients with emphasis on its causes, severity, medications and consequences of non adherence with treatment.
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The global burden of non-communicable diseases continues to grow and tackling it constitutes one of the major challenges for development in the twenty-first century. Non-communicable diseases, predominantly cardiovascular diseases, diabetes, cancers, and chronic respiratory diseases, caused an estimated 35 million deaths in 2005 globally. This figure represents 60% of all deaths globally, with 80% occurring in low and middle-income countries. Non-communicable diseases, mental health disorders, HIV/AIDS and tuberculosis, all together represented 54% of the burden of all illness worldwide in 2001 and is expected to exceed 65% of the global burden of disease in 2020 (“WHO | 2008-2013 Action plan). Contrary to popular belief, non-communicable diseases and mental health problems are also prevalent in developing countries, representing as much as 46% of the total burden of disease for the year 2001, and predicted to rise to 56% by 2020 (WHO 2003).

Hypertension, which is a non communicable disease, is increasingly becoming a worldwide disease and is estimated to cause 7.5 million deaths, about 12.8% of all total deaths. It is as prevalent in many developing countries, as in the developed world (“WHO | Raised blood pressure,” n.d.). Countries vary widely in capacity for management of hypertension, but worldwide it is observed that the majority of diagnosed hypertensive’s are inadequately controlled (WHO/ISH 2003). Hypertension contributes
significantly to cardiovascular morbidity and mortality. Globally, in 2000 the overall burden of hypertension in adults was 26.4% and this is expected to rise to 29.2% by 2025 (Kearney et al., 2004). In their compilation of National health surveys in various countries Dreisbach and Batuman found that there was a high prevalence of poor control of hypertension. They reported that prevalence of hypertension was 22% in Canada, of which 16% was well controlled; 26.3% in Egypt, of which 8% was controlled; and 13.6% in China, of which 3% was controlled (Dreisbach & Batuman, 2012). Some of the greatest challenges in global health are predicting how the burden of hypertension in populations from low and middle-income countries will develop. This is specifically in the sub-Saharan African countries taking into account the evolving paradigms of diseases of affluence and the dynamic character of the changes between and within countries (Damasceno et al., 2009).

Hypertension has been identified as the most common cause of heart failure, stroke, chronic renal disease and spontaneous sudden deaths in Ghana (Buabeng, Matowe, & Plange-Rhule, 2004). The prevalence of hypertension has been on the increase in Ghana. In 2002 Amoah found overall crude prevalence was 28.3% and age-standardized prevalence, to the new standard world population was 28.4% in Accra. Studies show it has a prevalence ranging from 19% in the rural areas to 54.8% in the urban areas. It is becoming more common as urbanization increases (Addo et al., 2012). Due to scarce resources and inadequate healthcare provision, detection, treatment, and control of hypertension is very poor in sub-Saharan Africa (Cappuccio et al., 2004).
Poor adherence has been identified as the main cause of failure to control hypertension. Problems in treatment adherence are widespread, and seriously compromise the effectiveness of antihypertensive treatment. Several studies investigating adherence to chronic disease treatment have shown that patients often discontinue their medications or even do not take them at all because they consider them ineffective or experience undesirable side effects (Gimenes, Zanetti, & Haas, 2009). A patient's capability to follow treatment plans to achieve results is frequently compromised by many barriers such as patient-related, socio-economic, health care team and system related systems, condition-related and therapy related (WHO 2003). A study done in Ghana showed that 93% of the patients did not comply with their medications and 96% of the non-adherent patients cited unaffordable drug prices as the main reason for non-adherence (Buabeng et al., 2004).

According to the World Health Organization (WHO), in developed countries, non-adherence of patients with chronic diseases is around 50%, being probably higher in developing countries. Unfortunately, non-adherence is a frequent issue with prevalence varying from 17% to 60% depending on the definition used and the methods applied to detect non-adherence. In many countries less than 25% of patients treated for hypertension achieve optimum blood pressure despite the availability of effective treatments. Studies in China, the Gambia and the Seychelles show that, only 43%, 27% and 26%, respectively, of patients with hypertension adhere to their antihypertensive medication regimen. In developed countries, such as the United States, only 51% of the patients treated for hypertension adhere to the prescribed treatment (WHO 2003).
In more than two thirds of people living with hypertension poor adherence is the primary cause contributing to lack of good blood pressure control. Adequate blood pressure control therefore requires good treatment and good adherence to medication (Akpa et al., 2005). Good adherence improves blood pressure control and reduces the complications of hypertension. The economic burden of non-adherence is important, not to mention the clinical consequences for patients (Pruijm, Maillard, & Burnier, 2008). Poor adherence is the greatest risk factor associated with increased incidence of heart failure in the elderly. It also leads to significant adverse events, including increased incidence of chronic kidney disease, atherosclerosis, stroke, and diabetes (Munger, Van Tassell, & LaFleur, 2007).

The magnitude and impact of poor adherence in developing countries is assumed to be even higher given the scarcity of health resources and inequities in access to health care. Poor adherence is the primary reason for suboptimal clinical benefit. It causes medical complications of disease, reduces patients’ quality of life, and wastes health care resources. Taken together, these direct consequences impair the ability of health care systems around the world to achieve population health goals.

1.2 Statement of the Problem

Hypertension is an important public health problem in Ghana with prevalence ranging between 19% and 54.8% (J Addo et al., 2012). An increase in morbidity and mortality associated with hypertension does not only reflect a high prevalence but also poor adherence to medication. Poor adherence to medication has led to a significant increase in
the incidences of stroke, ischaemic heart disease, congestive heart failure and chronic renal disease and it sometimes causes sudden death irrespective of age, gender and settlement area (Buabeng *et al.*, 2004). Low adherence also compromises the effectiveness of treatment, the quality of life of the patients and increases the burden on the limited resources of healthcare systems. It is also associated with higher risk of hospitalization and mortality. Hypertension and its related complications accounted for about 50% of medical admissions in the leading tertiary hospital in Accra in 2011 with cerebrovascular accident being the first of the top ten causes of death in the hospital (KBTH Annual Report 2011).

A general opinion from the healthcare team and even from patients show that adherence to their antihypertensive medication is suboptimal. In view of the complications nonadherence to anti hypertensive medicines brings and its burden on healthcare resources this study seeks to evaluate the level of adherence in KBTH and factors influencing adherence particularly the use of non prescribed medications.
1.3 Conceptual Framework

![Conceptual Framework Diagram]

Figure 1: Conceptual framework

1.4 Justification

Ensuring patients’ adherence with anti hypertensive medications to prevent complications of hypertension remains a major challenge to public health in many developing countries. Poor adherence to treatment is the most important single reason for uncontrolled hypertension. This has led to the high admission rate of patients suffering from complications of hypertension with equally high morbidity and mortality rates. In Korle
Bu Teaching Hospital hypertension has been the first of top ten diseases reported at the OPD for two consecutive years and cerebrovascular accident the first of the top ten causes of death (KBTH, 2011). Thus it is essential to identify such factors and develop strategies to improve adherence. In improving patient adherence patient counseling as well as new initiatives are needed to help ensure maximum adherence from patients. The purpose of this study was to describe the adherence behaviour of hypertensive patients to their prescribed medications and to identify the factors which influence the observed adherence behavior. It will also be used to identify the use of non prescribed medications to control hypertension. Such information would assist health care professionals to manage hypertension appropriately and also assist policy makers in developing context specific and relevant policies capable of improving adherence.

1.5 OBJECTIVES

1.5.1 General Objective

To determine factors influencing adherence to oral anti-hypertensive drugs amongst patients attending Korle-Bu Teaching Hospital.

1.5.2 Specific Objectives

1. To determine the level of adherence among patients to antihypertensive medications

2. To determine factors influencing adherence

3. To determine the use of non prescribed medications amongst respondents for hypertension
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1. HYPERTENSION

2.1.1. Classification of hypertension

Hypertension is defined as an elevated systolic blood pressure (SBP), diastolic blood pressure (DBP) or as BP in excess of 140/90 mm Hg (Chobanian et al, 2003). A clinical diagnosis of hypertension is based on the mean of two or more properly measured seated blood pressure measurements taken on two or more occasions. The Seventh Report of the Joint National Committee (JNC 7) on Detection, Evaluation and Treatment of High BP classifies it based on systolic and diastolic values. The normal blood pressure value is less than 120/80 mmHg.

Table 2-1 Classification of Hypertension

<table>
<thead>
<tr>
<th>Category</th>
<th>SBP mmHg</th>
<th>DBP mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and&lt;80</td>
</tr>
<tr>
<td>Pre Hypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Hypertension Stage 1</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Hypertension Stage 2</td>
<td>&gt;=160</td>
<td>or&gt;=100</td>
</tr>
</tbody>
</table>

(Chobanian et al., 2003)

Prehypertension is not a disease category but one to show that individuals are at a high risk of developing hypertension so that both health care providers and individuals are made aware. These individuals are advised and encouraged to practice lifestyles
modifications in order to reduce their risk and prevent the disease from developing in the future.

There are generally two main types of high blood pressure:
Primary (Essential) Hypertension is the main form of high blood pressure and accounts for about 90-95% of cases. There is no single identifiable cause and potential causes include genetic and environmental factors. Several risk factors are thought to contribute to hypertension. Secondary hypertension is a rare form of high blood pressure and is mostly caused by another medical condition or treatment.

2.1.2. Causes of Hypertension

- Chronic kidney disease
- Coarctation of the aorta
- Cushing syndrome and other glucocorticoid excess states including chronic steroid therapy
- Drug-induced or drug-related
  - Adrenal steroid hormones
  - Cocaine, amphetamines, other illicit drugs
  - Cyclosporin and tacrolimus
  - Erythropoetin
  - Excessive alcohol intake
  - Inadequate doses of medications
  - Liquorice including some chewing tobacco
  - Nonadherence to medications
  - Nonsteroidal anti-inflammatory drugs: cyclo oxygenase 2 inhibitors
Obesity
Oral contraceptive hormones
Selected over-the-counter dietary supplements and medicines e.g. ephedra,
Sympathomimetics (Decongestants, Anorectics)

- Obstructive uropathy
- Phaeochromocytoma
- Primary aldosteronism and other mineralocorticoid excess states
- Renovascular hypertension
- Sleep apnea
- Thyroid or parathyroid disease (Chobanian et al., 2003)

2.1.3. Epidemiology of Hypertension

The magnitude of hypertension and its burden in both developing and developed
countries contributes to the rising worldwide epidemic of cardiovascular disease
(Kearney et al., 2005). Studies done from 1980 through to 2003 show that the prevalence
of hypertension has remained stable or decreased in developed countries and increased in
developing countries (Kearney et al., 2004). Prevalence increases in patients older than
60 years and in many countries about 50% of people in this age group are hypertensive.
Approximately 1 billion people have hypertension worldwide contributing to more than
7.1 million deaths per year. National health surveys in various countries have shown a
high prevalence of hypertension with poor control some of which are Canada 22% of
which 16% is controlled, 26.3% in Egypt of which 8% is controlled and 13.6% in China
of which 3% is controlled (Whelton, 1994). Cardiovascular diseases are responsible for
one third of global deaths and contribute greatly to the global disease burden (Whitworth,
2003). For every 20 mm Hg systolic or 10 mm Hg diastolic increase in BP, there is a doubling of mortality from both ischemic heart disease and stroke (Chobanian et al., 2003).

2.1.4. Hypertension as a public health problem

Hypertension is common and now regarded as a major public health problem worldwide (Cappuccio et al., 2004) and in much of Sub-Saharan Africa detection, treatment and control are very poor due to scarce resources and inadequate healthcare provision (Amoah, 2003). Epidemiological data on Africa are scarce. Taking into account the evolving paradigms of diseases of affluence, some of the challenges in global health are predicting how the cardiovascular risk profile of low and middle income populations will develop especially in the Sub Saharan African countries which are undergoing epidemiological transition (Yusuf, Reddy, Ounpuu, & Anand, 2001).

The prevalence of hypertension is higher in urban than rural areas in SSA as compared to the USA and Europe that have higher prevalence in rural areas (Mainous et al, 2004). The prevalence of hypertension in SSA is as high as that from most countries with well established economies, increasing with age in most studies but with lower detection, treatment and control levels (Wolf-Maier et al., 2004). In most studies done less than 40% of people did not know of their disease state, less than 30% were on drug treatment and less than 20% had controlled blood pressure (Addo, Smeeth, & Leon, 2007). Surveys done show that for hypertensive patients older than 65 years in rural West Africa the prevalence of hypertension is about 30% to 40%, about 50% in semi urban West Africa and 50% to 60% in a mixed South African population (Cappuccio et al., 2004). Prevalence of hypertension in Abidjan in 2005 and Cotonu in 2007 was 21.7% and 27.3%
respectively with higher prevalence in Niger 42% (WHO 2003). Prevalence in semi urban Nigeria was 37% and 40% in Burkina Faso.

In a systematic review of the epidemic of hypertension in Ghana by Bosu (2010) the prevalence of hypertension ranged from 19% to 48% between studies. Age and sex composition of study populations, sampling strategy, measurement of blood pressure and definition of hypertension varied between studies. Sex differences were generally minimal and urban populations tended to have higher prevalence than rural populations in studies with mixed population types. Factors independently associated with hypertension included older age groups, over nutrition and alcohol consumption. Whilst awareness, treatment and control seemed to have improved between 1972 and 2005 less than one third of hypertensive subjects were aware they had hypertension and less than one tenth had their blood pressure controlled in most studies.

A review of population based studies done in Ghana on hypertension by J. Addo et al (2012) realized 11 studies with surveys conducted between 1973-2009 which showed that the prevalence of hypertension was higher in urban than rural areas in studies that covered both areas and hypertension increased with increasing age with prevalence ranging from 19.3% in rural areas to 54.6% in urban areas. The lack of awareness and inadequate treatment of hypertensive patients’ compounds the high burden of hypertension. Public health response to this should be to promote awareness and understanding of lifestyle changes and to plan strategies for hypertension management (Mittal & Singh, 2010). Although prevention is possible, it is rarely achieved, and treatment can lead to a reduced incidence of complications, including stroke, coronary heart disease, heart failure, and kidney disease (Damasceno et al., 2009) 23 million
cardiovascular deaths are projected by 2030 with about 85% occurring in low and middle income countries (Mathers & Loncar, 2006).

2.1.5. Risk Factors for Hypertension

Although elevated blood pressure cannot be linked to a known cause several risk factors are thought to contribute to it. Excessive alcohol intake which is more than 2 drinks a day increases the risk of developing hypertension. Moderation refers to the amount consumed per day, not the average consumption over several days. Epidemiological studies have shown a positive relationship between heavy alcohol intake and hypertension and drinking outside meals also seem to have a significant effect on the risk of hypertension irrespective of the amount of alcohol taken in. More than two drinks a day for men and one a day in women can significantly raise SBP about 2-4 mm Hg on average. 1 drink= 0.5 oz or 15 ml ethanol contains about 12g ethanol. (Stranges et al., 2004)

Excess sodium and reduced potassium may cause hypertension by altering the physiology of arterial smooth muscle, the central nervous system and the kidney. Sodium should be reduced to less than 2400 mg/day which will cause a reduction of SBP by about 2-8 mmHg (“Hypertension,” 2013).

Risk increases if a family has a history of cardiovascular disease. This increases when a first degree blood relative before the age of 55 years develops coronary heart disease or stroke for a man and before 65 years for a female relative (Roger et al., 2012).
Increasing age significantly increases the prevalence of hypertension in those aged 60 and above. For people aged 65 years and older it affects more women than men whilst for those under 45 years it affects more women than men (Roger et al., 2012).

Obesity increases the risk of development and progression of hypertension and stroke by 50% and predisposes one to diabetes which is also a risk factor for hypertension. Increased obesity between 30-50 years of age is associated with significant increases in diastolic blood pressure (He, Whelton, Appel, Charleston, & Klag, 2000).

Tobacco use is one of the most significant risk factors for cardiovascular diseases and many other health conditions. Smoking causes an increase in peripheral vascular resistance leading to hypertension. Smoking raises blood pressure by increasing plasma norepinephrine. Nicotine causes the arteries to constrict leading to high pressure. The synergistic effects of smoking and high blood pressure on cardiovascular risk are well documented although the long term effect of smoking on blood pressure is less clear (Health, 2013).

Stress has become a prevalent part of people’s lives and its effect on blood pressure is of great public health importance. Although it does not directly cause hypertension it can lead to repeated blood pressure elevations which finally lead to hypertension. Stress can cause hypertension through repeated blood pressure elevations and also by stimulation of the nervous system to produce large amounts of vasoconstriction hormones that will increase blood pressure. There is emerging evidence that the various risk factors for hypertension do not work in isolation but tend to interact in clusters. So exposure to stress will not only increase BP levels but will also lead to increased alcohol and fat intake. A
final common pathway for many of these risk factors is the sympathetic nervous system
which is involved in the development of essential hypertension in its early stages and in
the hypertensive effects of salt, obesity, and possibly stress as well ("Kaplan’s Clinical
Hypertension 9th edition,").

2.1.6. Management of hypertension

This involves both non pharmacological and pharmacological treatment.

Non pharmacological management

According to Chobanian et al (2003) lifestyle modification is essential for the prevention
of hypertension and should form an integral part of the management of those with the
disease.

A randomized controlled clinical trial to determine the clinical effectiveness of lifestyle
modifications to reduce cardiovascular risk in pre-hypertensive individuals was
conducted in the Mexico PREHIPER I Study by Marquez-Celedonio et al (2009). The
researchers randomly assigned 92 patients into treatment and control groups and
collected baseline data from both groups. The treatment group undertook a lifestyle
modification programme involving dietary modification, physical activity and
educational sessions for a period of six months whilst the control group was managed
following the usual recommendations provided by primary health care clinics in Mexico.
The results showed that blood pressure, waist measurement and body weight, an
improvement in their physical and aerobic condition and were more likely to quit
smoking. There was no change in control subjects. Lifestyle modifications decreased cardiovascular risk in individuals with pre-hypertension.

Lifestyle modifications which lower blood pressure are weight reduction, adopting the Dietary Approach to Stop Hypertension (DASH) eating plan, reducing alcohol consumption, reducing dietary salt intake and doing regular exercise. Lifestyle modifications reduce BP, enhance antihypertensive drug management, prevent or delay the onset of hypertension and reduce cardiovascular risk. A combination of two or more lifestyle achieves better results (Appel et al., 2003). For overall cardiovascular risk reduction patients are strongly advised to quit smoking. Table 2-2 summarizes the DASH plan.

**Weight Reduction:** Body mass index (BMI) is a measure of overweight and obesity and it is obtained by dividing body weight in kilogrammes by the height in metres squared. Individuals with a Body Mass Index (BMI) of below 18.5kg/m² are considered underweight 18.5-24.9kg/m² are considered to have optimal weight for height, those with a BMI of 25.0-29.9kg/m² are obese and those with BMI of 30.0kg/m² and above are considered obese (“Healthy Weight,” CDC 2013). Overweight and obesity are positively associated with hypertension, type2 diabetes, cancers and cardiovascular diseases and weight loss is an important approach for primary prevention of hypertension (Jiang He et al., 2000).
Table 2-2 Lifestyle Modifications to Prevent and Manage Hypertension

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>Approximate Systolic Blood Pressure Reduction (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Reduction</td>
<td>Maintain normal body weight (body mass index 18.5-24.4kg/m²)</td>
<td>5-20mmHg/10kg weight reduction</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>Consume a diet rich in fruits, vegetables and low fat dairy products with a reduced content of saturated fat and total fat</td>
<td>8-14mmHg</td>
</tr>
<tr>
<td>Dietary Sodium Reduction</td>
<td>Reduce dietary sodium intake to no more than 100mmol per day (2.4g sodium or 6g sodium chloride)</td>
<td>2-8mmHg</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Engage in regular aerobic physical activity such as brisk walking (at least 30 minutes per day, most days of the week)</td>
<td>4-9mmHg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>Limit consumption to no more than 2 drinks (eg 24 oz beer, 10 oz wine or 3 oz 80-proof whiskey) per day in most men and to no more than 1 drink per day in women and lighter weight persons</td>
<td>2-4mmHg</td>
</tr>
</tbody>
</table>

(Chobanian et al., 2003)

Dietary changes: Reduced saturated fat and dietary salt consumption are important dietary factors in the prevention and control of hypertension. Necessary diet changes include an increase in fruits and vegetables, whole grains and low fat dairy products and a reduction in fatty foods (Sacks et al., 2001).
**Physical Activity:** Physical activity is very important for the prevention, treatment and control of high blood pressure. Research has shown that aerobic exercise can significantly reduce BP in patients with hypertension. Reduction in blood pressure following a single exercise treatment is 5-8mmHg for 11-12 hours for systolic and 6-8mmHg for 6-8 hours for diastolic blood pressure and reduction in blood pressure following exercise treatment ranges from 5-25mmHg for systolic and 3-25mmHg for diastolic blood pressure (Hagberg, Park, & Brown, 2000).

**Reduced alcohol intake:** In the COMBINE study to determine whether heavy drinking is associated with hypertension by Stewart *et al* (2008) the study evaluated blood pressure changes occurring during treatment for alcohol dependence. Appropriate methods for repeated measures data were used to assess the relationship of percent drinking days to SBP and DBP over a 16 week treatment period. Blood pressure reduction was evident in persons who were above the median BP at baseline. SBP decreased by an average of 12mmHg and DBP decreased by an average of 8mmHg. BP reduction occurred during the first month of treatment and the effect was similar regardless of age, sex, BMI, reported history of hypertension and use of antihypertensive medications. Reduction in alcohol consumption has a potent antihypertensive effect in alcoholics with higher blood pressure (Stewart *et al*, 2008).

**Pharmacological management:** This normally involves the use of drugs. Most people with hypertension especially those above 50 years reach the DBP goal once the SBP goal is achieved. The ultimate goal of public health is to reduce cardiovascular and renal morbidity and mortality thus the primary focus should be placed on attaining the SBP goal which will come with a decrease in CVD complications (Chobanian *et al*., 2003).
Averagely more than two thirds of hypertensive patients cannot be controlled on one drug and require at least two or more antihypertensive drugs from different groups. In the ALLHAT study 60% of all those whose BP was controlled to 140/90 mm Hg received two or more antihypertensive drugs and only 30% were controlled on one drug (Cushman et al., 2007). Commonly used oral antihypertensive drugs include:

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

2.1.7. Complications of hypertension

Complications of hypertension are mostly related to the cardiovascular, cerebrovascular, renal, vasculature and ocular systems.

Cerebrovascular complications are more closely related with systolic than diastolic blood pressure. Stroke happens when an artherosclerotic plaque breaks off inside the artery or the blood vessel ruptures to form a blood clot within the artery. If this blocks blood flow to the brain it can lead to a stroke. If it blocks blood flow to the heart it can result in a heart attack. Effective management and adherence can modify the risk or rate of progression.
Occurrence of ischaemic heart disease is reduced by 50% with antihypertensive therapy. Left ventricular hypertrophy may cause or facilitate many cardiac complications of hypertension including congestive heart failure, ventricular arrhythmias, myocardial ischaemia and sudden death. Left ventricular diastolic dysfunction which may present like congestive heart failure is common in patients who have had hypertension for many years.

High blood pressure damages the small blood vessels in the kidney and affects its ability to excrete waste properly which leads to chronic kidney disease. This leads to tiredness, water retention leading to swollen ankles, feet or hands. It also leads to shortness of breath and itchy skin.

By placing added stress on the blood vessels hypertension can result in a buildup of cholesterol and fatty substances on the inside walls of the blood vessels causing atherosclerosis. The narrowed arteries limit or block the flow of blood to the heart muscle which deprives the heart of oxygen.

Hypertension can damage the small blood vessels in the retina which can lead to shortage of oxygen to the eye tissue resulting in eye disease and sometimes loss of vision.

2.2. Adherence

Medication adherence is the extent to which patients take medications as prescribed by their health care providers. WHO 2003 adherence project defines adherence to long-term therapy as the extent to which a person’s behavior-taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (“2003 World Health Organization (WHO)/Internation...). The word
“adherence” is preferred by many health care providers, because “compliance” suggests that the patient is passively following the doctor’s orders and the treatment plan is not based on a therapeutic alliance or contract established between the patient and the physician. Concordance is also used sometimes and it indicates the extent to which prescriber and patient come to an agreement about the regimen that the patient will take (Vermeire et al., 2001).

Medication adherence refers to whether patients take their prescribed medications continuously. Medication adherence behavior has been divided into 2 main concepts adherence and persistence. Adherence is the intensity of drugs used during duration of therapy and persistence refers to overall duration drug therapy (Cramer et al., 2008).

2.2.1. Adherence to hypertension treatment

Hypertension is a major risk factor for the development of cardiovascular disease and has no cure therefore patients are expected to take their medications for life. Drug treatment of hypertension demands that patients comply with their medications as prescribed. Effective and well tolerated once a day antihypertensive drugs are now available yet adherence to prescribed treatment continues to be poor. This is one of the main causes of unsatisfactory control of blood pressure leading to increased cardiovascular risk and target organ damage (Vrijens et al., 2008).

Adherence to pharmacological and nonpharmacological treatment of hypertension improves the quality of life of the patient by preventing complications and early death. Medication non adherence is a complex problem that has a significant impact on our healthcare system. Estimates of patients’ adherence vary from 35% to as high as 97% due
to the absence of a common taxonomy, data source and type of method used (Vrijens et al., 2008). Though antihypertensives have a positive safety and tolerability profile and reduce the risk of stroke by about 30% and myocardial infarction (MI) by approximately 15% research shows that as many as 50% to 80% of patients are not adherent (Brown & Bussell, 2011). Non adherence to long term medication regimens is worse than non adherence to short term regimens. Most studies tend to converge on a non adherence rate of 50% for long term pharmacologic therapy and 20-25% for medications prescribed for short periods of time. Various factors affect patients’ adherence with antihypertensive medications. A qualitative study performed by Gascon et al (2004) to identify factors related to adherence realized that patients had fears and negative images about antihypertensive drugs and there was also a lack of basic background knowledge about hypertension thus leading to poor adherence (Gascón et al, 2004). Another study by Hashmi et al (2007) found that adherence was high in patients with increasing age, those with better awareness and increasing number of tablets whilst depression reduced adherence (Hashmi et al., 2007). Patients’ attitudes also influence their adherence behavior. Attributes such as carelessness, hopelessness and denial contribute significantly to medication adherence. Those in denial would not bother to take their medications whilst those who are careless are most likely to skip their medications for several days. Those in a state of hopelessness would not appreciate the benefit of taking their medicine.

2.2.2. Factors affecting adherence

Adherence is achieved through a combination of many factors. Research on adherence has identified multiple reasons for patients’ failure to adhere such as patients’
unwillingness to accept the unpleasant side effects of the medication, their lack of responsibility and motivation, their loss of faith in the therapy, early recovery, or other reasons. Factors influencing adherence may be grouped into several categories namely patient related factors, health care system factors, disease related factors, therapy related factors and social and economic factors (WHO 2003).

**Patient related factors:** Patient related factors represent the knowledge, attitudes, beliefs, perceptions, expectations and resources of the patient. Factors identified to be in this group include demographic factors, stress and emotional problems, forgetfulness, patient-prescriber relationship, health literacy and patient knowledge (Jin et al, 2008). Viera et al realized that there were still some individuals who did not know that most of the time people with high BP do not feel it, believed that nothing could be done to prevent high BP and some who are not that taking medications will cure high BP thus leading to poor adherence (Viera et al, 2008). Other factors that influence adherence include fear of using antihypertensive medications and becoming dependent on them for the rest of their lives, the belief that natural remedies are effective in controlling hypertension, the belief that the disease has been cured provided the blood pressure was controlled, as well as low awareness of hypertension treatment, risk factors, characteristics and complications (Gascón et al, 2004).

**Health care system factors:** A good prescriber-patient relationship improves adherence. There are other factors that have a negative effect. These include lack of accessibility, long waiting time, tired prescribers, difficulty in getting drugs supplied, poorly developed
health services, short consultations, unwelcoming attitude from hospital staff, inadequate and delays in reimbursement by health insurance plans and lack of training for health care providers on managing chronic diseases (WHO 2003). Research shows that the quality of the patient-provider relationship including the way health care providers communicate and build trust with their patients relates to favourable adherence patterns among chronically ill patients. A meta analysis done by Zolnierek and Dimatteo showed that communication is positively correlated with patient adherence and there is a 19% higher risk of non adherence among patients whose physician communicates poorly than among patients whose physicians communicates well (Haskard Zolnierek & DiMatteo, 2009).

**Disease related factors**: These factors represent particular illness-related demands faced by the patient. Some determinants of adherence are disease symptoms, severity of the disease and the availability of effective treatments. Co-morbidities such as depression and alcohol abuse affect adherence negatively (WHO 2003). For the majority of patients who have no symptoms of hypertension, the fact that they do not feel unwell may encourage non adherence (Ross, Walker, & MacLeod, 2004).

**Therapy-related factors**: Many therapy-related factors affect adherence. The most important ones include treatment complexity, taste of medication, side effects of the medication, duration of treatment period, route of administration and previous treatment failures. Interventions should be tailored to meet the needs of the patient in order to achieve maximum adherence levels (Osterberg & Blaschke, 2005). Medications which reduce blood pressure sometimes cause adverse events in previously asymptomatic
patients. This could lead to non adherence and even to discontinuation of therapy. Side effects from anti hypertensive medications are common. Regimens that require disruption to their lifestyle will be less welcome by patients. A systematic review found that the number of doses prescribed per day is inversely related to adherence. The more medications a patient has to take every day the easier it is forget (Claxton, Cramer, & Pierce, 2001).

**Socio- economic factors:** Socioeconomic status has not consistently been found to be an independent predictor of adherence. In developing countries low socioeconomic status puts people in the dilemma of competing priorities. These include demands to use the limited resources available to cater for their children or needs of other family members they take care of. Some other factors are low literacy, inability to take time off work, unemployment, culture and lay beliefs about illness and treatment, poor socio-economic status, lack of effective social support, age, war and poverty (WHO 2003). The association between adherence and socio-economic factors appears to be inconsistent among many studies.

A patient’s age could influence the decision to comply with antihypertensive medications. Elderly patients tend to have poor compliance due to memory loss and a reduction in functional capabilities such as failing eyesight, and decreased dexterity with hands that could affect activities such as bottle opening and tablet division. In addition elderly patients tend to have multiple morbidities that necessitate various drug regimens thus further compounding the problem. Age related alterations in pharmacokinetics and pharmacodynamics make this population even more vulnerable to problems resulting
from non-adherence (WHO 2003). Adherence may also be poor in younger patients due to ignorance of the true nature of hypertension or denial of the existence of the disease.

Association between adherence and gender is sometimes consistent and in other studies contradictory. A cross-sectional study involving Chinese immigrants conducted between 2002 and 2003 in the USA revealed that women were slightly more compliant (75%) than men (69%) with their medication regimens (Li, Wallhagen, & Froelicher, 2008). Some other studies have however found no significant relationship between gender and adherence.

Another significant factor affecting adherence is both total and out-of-pocket cost of medications. The high cost of antihypertensive medications contributes to poor adherence in developing countries. A study conducted in a tertiary hospital in Ghana showed that 93% of patients were non-adherent with their antihypertensive regimens and 96% of them cited unaffordable drug prices as the main reason (Buabeng et al., 2004).

2.2.3. Measurement of adherence

Methods available for measuring adherence are divided into direct and indirect methods. Each comes with its advantages and disadvantages and no method is considered as the gold standard.
Table 2-3 Methods for measuring adherence

<table>
<thead>
<tr>
<th>Test</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct observed therapy</td>
<td>Most accurate</td>
<td>Patients can hide pills in their mouth and discard them later, impractical for routine use</td>
</tr>
<tr>
<td>Measurement of the level of medicine or metabolite in the blood</td>
<td>Objective</td>
<td>Variations in metabolism. Can give a false impression of adherence and it is expensive</td>
</tr>
<tr>
<td>Measurement of the biologic marker in the blood</td>
<td>Objective in clinical trials and can also be used to measure placebo</td>
<td>Requires expensive quantitative assays and collection of bodily fluids</td>
</tr>
<tr>
<td><strong>Indirect Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient questionnaires, patient self report</td>
<td>Simple, inexpensive, most useful in clinical settings</td>
<td>Susceptible to error with increases in time between visits. Results are easily distorted by the patient</td>
</tr>
<tr>
<td>Pill counts</td>
<td>Objective quantifiable and easy to perform</td>
<td>Data easily altered by the patient e.g. pill dumping</td>
</tr>
<tr>
<td>Rates of prescription refills</td>
<td>Easy to obtain data</td>
<td>Prescription refill is not equivalent to ingestion of medicines, requires a closed pharmacy system</td>
</tr>
<tr>
<td>Assessment of patients clinical response</td>
<td>Easy to perform</td>
<td>Factors other than medication adherence can affect clinical response</td>
</tr>
<tr>
<td>Electronic medication monitors</td>
<td>Precise results are easily quantified, tracks patterns of taking medications</td>
<td>Expensive, requires return visits and downloading data from medication vials</td>
</tr>
<tr>
<td>Measurement of physiologic markers e.g. heart rate in patients taking beta blockers</td>
<td>Easy to perform</td>
<td>Marker may be absent for other reasons e.g. increased metabolism, poor absorption, lack of response</td>
</tr>
<tr>
<td>Patient diaries</td>
<td>Helps to correct for poor recall</td>
<td>Easily altered by patient</td>
</tr>
</tbody>
</table>

(Osterberg & Blaschke, 2005)

Electronic pharmacy data are becoming widely available and a patient’s adherence behavior is seen by the way in which refills are obtained and the frequency with which
they are obtained. Adherence based on refill data has been correlated with a wide range of patient outcomes (Ho et al., 2008). Two most common used measures of medication adherence based on pharmacy data are the medication possession ratio and the proportion of days covered methods, which are mainly defined by the number of doses dispensed in relation to a dispensing period (Ho, Bryson, & Rumsfeld, 2009).

2.2.3.1. **Direct Methods of Adherence**
Direct observation is a direct method of measuring adherence however the limitation is that it is impractical to measure the adherence in an outpatient setting particularly for those on long term treatment (Hawkshead & Krousel-Wood, 2007).

Biological assays are used to determine the level of adherence by measuring the drug metabolites in the blood or urine as this would provide convincing evidence of drug ingestion. However such measurements may be misleading since many patients are on several drug combinations. There may be variations in metabolism that can affect serum levels in individuals with respect to factors such as diet, pharmacokinetics and other diseases (Ho, Bryson, & Rumsfeld, 2009)

2.2.3.2. **Indirect methods of adherence**
Objective
Pill count is an objective method used to evaluate adherence by viewing the actual pill container and calculating how many pills should be left given the date of inspection, dosing and last refill. Pill counts are easy to perform and are frequently used in randomized controlled clinical trials to assess medication adherence. Although pill counts are simple to measure they do not accurately capture the exact time the medication was taken and drug holidays and thus should not be assumed to be a good measure of adherence. Patients could dump pills before they visit in order to appear to be following the regimen (J. K. Lee et al., 2007).

Electronic monitoring (Medication Events Monitoring System (MEMS)) is considered the most sophisticated means of assessing adherence which enables timing of pill consumption and is the closest to a gold standard for measuring adherence. It consists of a standard prescription bottle fitted with a cap that contains an electronic circuit registering the date and time of openings and closing of the bottle. The stored information can be used by health professionals such as dosing schedules and its appropriateness. The limitations with this method are that there is no evidence that the tablets taken from the bottles are actually ingested by the patient and the device is expensive (van den Boogaard et al, 2011).

Prescription refill records is the most practical and perhaps least problematic of all the methods used in measuring adherence. The number of refills obtained by a patient may be used to assess compliance. According to Wetzels et al (2006), this method is objective, relatively inexpensive and does not involve invading a patient’s privacy. The initial dates the individual collected the medications from the pharmacy and when a refill is made are noted. However the major drawback with the method is that it does not
necessarily correlate with actual medication ingestion as other factors such as forgetfulness or carelessness may contribute significantly to non compliance (Wetzels et al, 2006)

**Subjective**

Patients’ self-report is the most practical and widely used means of assessing adherence however it overestimates adherence and can be biased by inaccurate patient recall. Gehi et al found that in patients with stable coronary patient self-report of medication nonadherence was strongly associated with adverse cardiac events on the basis of a single screening question about medication adherence (Gehi, Ali, Na, & Whooley, 2007). Self-report can be biased by inaccurate patient recall or where patients report an overly optimistic estimation of adherence to their healthcare providers or a combination of these factors (Haynes, McDonald, & Garg, 2002).

The Morisky scale is also a commonly used validated 4 item self reported measure of adherence that has been shown to be predictive of adherence to blood pressure control and cardiovascular medications. It consists of four questions on forgetting medication, carelessness and stopping medication when feeling better or worse with YES answers scoring 0 and NO answers scoring 1. The scale gives an idea to which extent each patient is adherent, the lower the final score the stronger the adherence to medication. This was however supplemented with additional 4-items to address the circumstances surrounding adherence behaviour. The eight-item scale had a higher sensitivity of 93% than the original 4-item scale which indicates that the scale is good at identifying patients who have low medication adherence and have uncontrolled blood pressure relative to all patients who have uncontrolled blood pressure. (Morisky et al, 1986, Morisky et al,
This scale includes 7 items with yes/no response options and 1 item with a 5 point Likert scale response option. The items in the scale provide information regarding barriers to medication adherence such as forgetting to take medications, not taking medications when one feels worse and difficulties in sticking to a treatment plan. Based on an overall score patients are classified as having low, medium or high adherence.

The patients with high medication adherence and good blood pressure control should be complemented on their medication taking behavior and reminded of the benefits of controlled blood pressure and importance of continued adherence to medications. The patient with inadequate blood pressure control but high medication adherence should be considered as patients with difficult to control or refractory hypertension or with inappropriate or inadequate pharmacologic treatment. In this case intensification of therapy to achieve the appropriate blood pressure response should be considered. However patients classified as having low adherence to medications and with poor blood pressure control should have repeated in depth education and adherence counseling (Moser & Setaro, 2006).

2.3. Non Prescribed Medication

Many different types of alternative non prescribed medication are believed to be effective for treating hypertension. Most people are not aware that certain prescription medicines or over- the- counter drugs interfere with the process of hypertension treatment. These include cold medicine, cough syrup, steroids, birth control pills, diet pills and Non Steroidal Anti-inflammatory Drugs (NSAIDS). Many of these well known and easy to get medications have been shown to cause negative blood pressure effects.
Usage of alternate medicine seems to be increasing worldwide and is reported to be between 20-80% in both African and other global populations (Eddouks et al, 2002). Socio-economic reasons have led more people especially low income rural dwellers in developing countries to use herbal medicine to control hypertension however more scientific research needs to conducted to confirm the efficacy of such herbal medications (Tabassum & Ahmad, 2011). Use of herbal medicine varies in different populations like 40% in the United States, 48.5% in Australia and 38.5% among the Indian population of Chatsworth in South Africa (Osamor & Owumi, 2010). In a clinic in India 63.9% of hypertensive patients took herbal medicine and in Morocco 80% of patients with hypertension and diabetes used herbal medicine for treatment (Eddouks et al., 2002, Shafiq et al, 2003 ). Presently some orthodox medical facilities co-exist with traditional medicine systems in many African regions and elsewhere. People use medications from one system exclusively or use medications from both systems simultaneously or one after the other.

2.4. Health Belief Model

The Health Belief Model (HBM) is a framework used to understand health behavior and likely reasons for non adherence with suggested actions that can be taken. Four major components for adherence are recommended. These are perceived susceptibility which is an individual’s perception of getting a disease. Perceived severity which refers to ones opinion of how serious a disease condition is and its consequences. Perceived barriers which are ones opinion of what will stop the individual from adopting new behavior. Perceived benefits refer to ones belief in the efficacy of the advised action to reduce risk.
or severity of the disease. Two concepts which were added later are cues to action which refers to factors that will start a person on the way to changing and self efficacy which is confidence in the ability to successfully do something (Rosenstock, Strecher, & Becker, 1988).

HBM proposes that patients weigh up a health-related behaviour (eg adherence) by considering their perceived susceptibility to an illness and the seriousness of the illness, as well the benefits of the action. The model includes the concept of barriers to action and cues which might prompt it (Ross et al., 2004).

Patients do not always take their medication exactly as prescribed and healthcare professionals are often unaware of how patients take their medicines. The purpose of assessing adherence is not to monitor patients but rather to find out whether patients need more information and support. This support may take the form of further information and discussion or involve practical changes to the type of medicine or the regimen. Any interventions to support adherence should be considered on a case-by-case basis and should address the concerns and needs of individual patients (NICE 2009, n.d.)
CHAPTER THREE

3.0 METHODS

3.1 Type of study

A cross-sectional study of hypertensive patients aged 18 years and above attending the KBTH hypertensive clinic at the OPD was used for the study. Quantitative method was used to assess the levels of adherence and factors influencing it amongst the patients.

3.2 Study Area

This survey was conducted in Korle-bu Teaching Hospital (KBTH) the only tertiary hospital in the southern part of Ghana. It lies about three kilometers West of the centre of Accra the capital of Ghana and is situated along the Guggisberg Avenue of the Ablekuma Constituency. It was established to provide tertiary healthcare for all Ghanaians by providing facilities to educate and train health professionals, conducting research and providing specialist outreach to patients in the regions and district. It is also a teaching hospital affiliated to the Medical school of the University of Ghana. The hospital has grown from an initial 200 beds to 2000 and has 17 clinical and diagnostic departments. It has an average daily out-patient attendance of 1500 with an average admission rate of about 250 patients per day. The hypertensive clinic is one of the clinics at the Out Patient Department (OPD) which is run for 4 days in a week for patients referred to the hospital. It has an average monthly attendance of 716 patients.
3.3 Study Population

The populations of interest were all adult hypertensive patients of the hospital reporting to the Medical out-patient department (OPD) of the Korle-bu Teaching Hospital. These patients had been diagnosed hypertensive and had been on medication for not less than six months.

**Inclusion criteria:** Patients aged 18 years and above, presenting with a history of hypertension at the OPD of the hospital for at least six months duration and on medication during the said period. Patients with co-existing medical conditions such as diabetes, dyslipidaemia, arthritis etc were all part of the study provided they were still on anti-hypertensive medication.

**Exclusion criteria:** Pregnancy induced hypertension patients were excluded from the study. Patients’ diagnosed hypertensive but less than six months duration were also excluded, likewise hypertensive patients on admission. Those in the pilot study were excluded as well as those who declined to participate.

3.4 Sampling

3.4.1 Sample size

With records from 2012, averagely the hospital recorded 8591 hypertensive cases from January-December for patients aged 18 years and above with a daily average attendance of 45 patients. An adherence level of 57.5% from a systematic review done by Bowry et
aI in 2011 on adherence to cardiovascular medication in resource limited settings was used.

Using Epi Info StatCalc Version 7, a minimum sample size of 361 was arrived at with:

- a population size of 9000 cases,
- an adherence level of 57.5% and
- confidence level of 95%

Making allowances for losses, it was approximated to 380.

3.4.2 Sampling method

All patients attending the clinic on all 4 clinic days were interviewed. Patients were interviewed in the order in which they queued and waited for the clinic to start. Queuing for a clinic starts at about 6am and continues until 11am. Interviewing continued until the total number of patients required for the sample was obtained.

3.5 Data Collection Techniques/Methods & Tools

Data was collected using a structured questionnaire by four research assistants. The questionnaire was formulated based on the health belief model (HBM) but modified to suit the study locally. The questionnaires were administered before the patients saw their physicians.

The first section of the questionnaire comprised of nine questions regarding socio-demographics such as age, gender, marital status, level of education, occupation, monthly income and mode of payment of antihypertensive drugs.
The second section consisted of eleven questions designed to evaluate their knowledge about the disease and treatment.

The third section consisted of five questions designed to measure their belief and motivations.

The fourth section consisted of six questions designed to evaluate the quality of care given to them. This was to measure some health care provider factors capable of having an influence on adherence to medications. These included waiting time in the clinic, having confidence in the health professionals, spending enough time with health professionals and having the opportunity to state problems and ask questions.

The last section consisted of questions which measured their adherence levels. This was done using the Morisky 8 Item Measurement Adherence Scale. The responses were either YES which has a score of 0 or NO which has a score of 1 to seven questions. The last question which has a 5-point Likert scale response option; (A) Never/Rarely (B) Once in a while (C) Sometimes (D) Usually (E)All the time had a score of 1 if the answer was A and a score of 0 if the answer was B to E. As per the Morisky scale scores for the 8 items were summed to create an overall adherence score with a possible range of 0 to 8, higher scores indicates better adherence. A score greater than 6 reflected high adherence, with lower scores reflecting low adherence.

3.6 Quality control

Training sessions were organized for the recruiters for this study. The questionnaire was translated into local languages such as Ga, Twi and Ewe. The interpretation was subjected to a process of validation by translating back into English to establish
equivalence with the original version. A set of guidelines was drawn up during the training with the aim of impressing upon the interviewer to read the questions exactly as they are written, repeat questions, if asked and to accept refusal to answer questions without any sign of irritation. The filled questionnaires were examined by the Principal investigator to check that they were consistent and complete to enhance quality. Data entry was done using EpiInfo Version 7 and STATA Version 11 was used for analysis.

3.7 Data Processing and Analysis

The data was sorted, coded, entered twice in separate files and then validated using EpiInfo Version 7.

Statistical analysis was performed using STATA Version 11. Data was presented using tables and graphs. Continuous variables were summarized by means and standard deviations whilst categorical variables were summarized in the form of frequencies and percentages. Age was modelled as a categorical variable with categories defined by: 0 (≤ 39), 1 (40 – 59) and 2 ( ≥ 60). After the univariate analysis all the independent variables with a p-value ≤ 0.05 were considered statistically significant. Bivariate and multivariate comparisons were made between the dependent and independent variables using chi square to determine association between dependent and independent variables and logistic regression to predict strength of association between factors influencing adherence respectively. The significant independent variables were regressed together to evaluate the group effect. The Morisky Medication Adherence Scale (MMAS) was used to estimate the level of adherence. The scores for the 8 items were summed to create an overall adherence score with a possible range of 0 to 8; higher scores indicated better adherence.
adherence. Based on this score patients were classified as either having high or low adherence. Scores of 6 and above were considered as high levels of adherence whilst scores below 6 were considered as low levels of adherence. Associations of variables with the MMAS score was checked with the help of logistic regression using MMAS score as the dependent variable (adherence) and study variables as independent variables.

3.8 Ethical consideration

Ethical clearance was sought from the Ghana Health Service Ethical Review Board and the Ethical Committee of KBTH before study commenced. Participants were hypertensive cases aged 18 years and above attending the hypertensive clinic at the OPD and had been on medication for at least 6 months. Participation of subjects conformed to the required ethical guidelines. Using a language well understood by the participants, all the participants were well informed about the study, its objectives and method of data collection. Participants who agreed to be part of the study gave their consent before being interviewed. They were also assured of strict confidentiality procedures and anonymity. Participants were informed that the outcome of study would be used to improve services received and that they were not going to be harmed in any way by participating in the study.
3.9 Pilot Study

Questionnaires were piloted in KBTH among 20 patients who met the inclusion criteria and were not included in the study sample. This was done to address mistakes and omissions in the questionnaire and to rephrase certain sentences to properly address the issues under study.
CHAPTER 4

4.0 RESULTS

4.1 Demographic and Socio-economic characteristics of respondents.

A total of four hundred and thirteen patients (413) were interviewed between May and June 2013. The required sample size was 380 but due to an increase in patient numbers and their willingness to participate in the study a sample size of 413 was obtained. The main characteristics are detailed in Table 4-1. The mean age was 57.80 years (SD 12.45) age range was 20-90 years. Majority of the respondents were females (64.5%). Most were between the ages of 40-59 years (48.9%) and this was closely followed by those above 60 years (44.5%). A greater percentage was married (63.7%) and had obtained education to the secondary level (44.1%). Traders/artisans (39.5%) were predominant as regards their occupation.

As shown in table 4-1 almost half of the respondents had an average monthly income of GH₵200-GH₵600 (41.4%); however 21.5% did not state their monthly income. About one-fifth of the respondents (19.6%) spent GH₵21-GH₵50 monthly on their medications but a greater majority (38.7%) did not state their monthly expenditure on drugs.

A small percentage (6.2%) had family members and friends paying for their drugs for them whilst 21.7% paid for drugs which could not be accessed on NHIS after getting those available.
Table 4-1 Patients demographic and socioeconomic characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 413</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>146</td>
<td>35.5</td>
</tr>
<tr>
<td>Female</td>
<td>267</td>
<td>64.5</td>
</tr>
<tr>
<td><strong>Age(years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 39</td>
<td>27</td>
<td>6.6</td>
</tr>
<tr>
<td>40-59</td>
<td>203</td>
<td>48.9</td>
</tr>
<tr>
<td>≥ 60</td>
<td>183</td>
<td>44.5</td>
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<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>60</td>
<td>14.5</td>
</tr>
<tr>
<td>Married</td>
<td>263</td>
<td>63.7</td>
</tr>
<tr>
<td>Divorced</td>
<td>28</td>
<td>6.8</td>
</tr>
<tr>
<td>Widowed</td>
<td>62</td>
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<tr>
<td><strong>Level of education</strong></td>
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</tr>
<tr>
<td>No Formal Education</td>
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<tr>
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<td>184</td>
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<tr>
<td>Tertiary</td>
<td>103</td>
<td>24.9</td>
</tr>
<tr>
<td>Other</td>
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<td>1</td>
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<td><strong>Occupation</strong></td>
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<td>Trader/Artisan</td>
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<td>Professional</td>
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<td>Retired</td>
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<td>24.7</td>
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<tr>
<td>Other</td>
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<td><strong>Monthly Income(₵)</strong></td>
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</tr>
<tr>
<td>≤ 200</td>
<td>95</td>
<td>23.0</td>
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<tr>
<td>201-600</td>
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<td>32.5</td>
</tr>
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<td>601-1000</td>
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</tr>
<tr>
<td>≥ 1001</td>
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<tr>
<td>Missing values</td>
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</tr>
<tr>
<td><strong>Expenditure on Drugs(₵)</strong></td>
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<td></td>
</tr>
<tr>
<td>≤20</td>
<td>50</td>
<td>12.1</td>
</tr>
<tr>
<td>21-50</td>
<td>81</td>
<td>19.6</td>
</tr>
<tr>
<td>51-100</td>
<td>77</td>
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</tr>
<tr>
<td>≥ 100</td>
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<td>10.9</td>
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<tr>
<td>Missing values</td>
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<td>38.8</td>
</tr>
<tr>
<td><strong>Drugs from NHIS</strong></td>
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</tr>
<tr>
<td>Yes</td>
<td>144</td>
<td>34.9</td>
</tr>
<tr>
<td>No</td>
<td>269</td>
<td>65.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>413</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean age of respondents in years (SD) = 57.80(12.45)
4.2 Knowledge of hypertension and its treatment

There were almost equal respondents in each category in their response to how long they had been diagnosed with hypertension. One third of the respondents (34.7%) were diagnosed between 5 to 10 years ago another one third had been diagnosed less than 5 years and the last third (31.5%) had been hypertensive for more than 10 years (Table 4-2).

Respondents’ knowledge on causes of hypertension was varied. Amongst the different combinations of responses given, a total of (36.3%) said their respective families had histories of hypertension. Other responses were different combinations of unhealthy diet, lack of exercise, age and stress. However, a third of the respondents, (32.0%), had no knowledge of the causes of hypertension (Table 4.2).

Stroke (87.7%) and heart failure (47.3%) were the 2 most common combinations of hypertension known among the respondents. Other known complications were renal failure and erectile dysfunction (Table 4.2).

Majority of the respondents were on more than one antihypertensive medication. The most common combination was one including calcium-channel blockers (81.1%). Those on Angiotensin-converting enzyme inhibitors and Angiotensin-II-receptor blockers in combination with other medications were about 42.0%. About the same number of respondents were on diuretics and beta adrenoceptors combinations as part of their medication regimen. Only a few took MethylDopa as part of their regimen (Table 4.2).

Total number of anti hypertensive tablets taken ranged from 1 to 6 daily with a mean of 3 tablets. Most of the respondents were taking 2 tablets daily with 94.3% of them taking their medications once daily. The number of respondents decreased with increasing
number of tablets showing the prevalence of once daily dosing. Majority of the respondents reported of no side effects (Table 4.2)

The most common co-morbidities reported were diabetes (33.0%) and high cholesterol (19.6%). Other medical conditions reported were asthma, arthritis and ulcer. Some of the respondents (44.8%) reported no co-existing medical condition (Table 4.2)

Of the 31.9% who take non prescribed drugs for good control of their blood pressure, 39.7% were taking herbal preparations, 33.6% were taking orthodox medications and 26.7% were taking both herbal and orthodox medications.

4.3 Patients’ motivation

About one third of the respondents (33.4%) believed they were suffering from complications of hypertension and most of them thought their hypertension was under control. Majority of the respondents believed their medications were effective in reducing their blood pressure levels. About 30.3% had to be reminded to take their medications. A great majority of them tended to follow the advice given to them by their physicians (Table 4.3).
Table 4-2 Patients knowledge on hypertension and its treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Freq</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration of illness (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>138</td>
<td>33.8</td>
</tr>
<tr>
<td>5 to 10</td>
<td>143</td>
<td>34.7</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>129</td>
<td>31.5</td>
</tr>
<tr>
<td><strong>Causes of hypertension</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family trait</td>
<td>149</td>
<td>36.3</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>131</td>
<td>32.0</td>
</tr>
<tr>
<td>Diet</td>
<td>101</td>
<td>24.6</td>
</tr>
<tr>
<td>Lack of exercise</td>
<td>81</td>
<td>19.8</td>
</tr>
<tr>
<td>Age</td>
<td>57</td>
<td>13.9</td>
</tr>
<tr>
<td>Stress</td>
<td>39</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Complications</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>306</td>
<td>87.7</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>165</td>
<td>47.3</td>
</tr>
<tr>
<td>Renal failure</td>
<td>29</td>
<td>8.3</td>
</tr>
<tr>
<td>Erectile Dysfunction</td>
<td>29</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Current medication</strong>*</td>
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<td></td>
</tr>
<tr>
<td>Ca2+-channel blockers</td>
<td>284</td>
<td>81.1</td>
</tr>
<tr>
<td>ACE Inhibitors &amp; Angiotensin-II-receptor blockers</td>
<td>147</td>
<td>42.0</td>
</tr>
<tr>
<td>Beta adrenoceptor blocking drug</td>
<td>135</td>
<td>38.6</td>
</tr>
<tr>
<td>Diuretics</td>
<td>135</td>
<td>38.6</td>
</tr>
<tr>
<td>Methyldopa</td>
<td>20</td>
<td>5.7</td>
</tr>
<tr>
<td><strong>Number of tablets taken daily</strong></td>
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<td></td>
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<tr>
<td>1</td>
<td>47</td>
<td>11.7</td>
</tr>
<tr>
<td>2</td>
<td>135</td>
<td>33.6</td>
</tr>
<tr>
<td>3</td>
<td>111</td>
<td>27.6</td>
</tr>
<tr>
<td>4</td>
<td>58</td>
<td>14.4</td>
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<tr>
<td>6</td>
<td>28</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Frequency of intake</strong>*</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>329</td>
<td>94.3</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>43.1</td>
</tr>
<tr>
<td>3</td>
<td>81</td>
<td>23.2</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Co-morbidities</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>123</td>
<td>59.4</td>
</tr>
<tr>
<td>Hyperlipidaemia</td>
<td>73</td>
<td>35.3</td>
</tr>
<tr>
<td>Asthma</td>
<td>14</td>
<td>6.7</td>
</tr>
<tr>
<td>Arthritis</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td>Ulcer</td>
<td>12</td>
<td>5.8</td>
</tr>
</tbody>
</table>

*Multiple answers allowed
4.4 Quality of care

Majority of the respondents were generally happy with the quality of care given by the health professionals. Over 90% reported that doctors and other health professionals showed interest during consultation and were given the opportunity to state their problems and ask questions about their current state of health as shown in Table 4-3. Generally respondents were satisfied with health information and advice provided by the doctors and other health professionals. Majority were also content with the time they spent with their physicians during consultation. A great number of the respondents said although they had enough confidence in their doctors and other health professionals, waiting time at the clinic was not acceptable to them (Table 4.3).

Table 4.3-3 Patients response to Motivational factors and Quality of care

<table>
<thead>
<tr>
<th>Variable</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (%)</td>
</tr>
<tr>
<td><strong>Patient motivation</strong></td>
<td></td>
</tr>
<tr>
<td>Suffering from complications</td>
<td>33.4</td>
</tr>
<tr>
<td>Good control of BP</td>
<td>85.1</td>
</tr>
<tr>
<td>Effective medication</td>
<td>84.5</td>
</tr>
<tr>
<td>Need to be reminded</td>
<td>30.3</td>
</tr>
<tr>
<td>Follow advice of physician</td>
<td>81.4</td>
</tr>
<tr>
<td><strong>Quality of care</strong></td>
<td></td>
</tr>
<tr>
<td>Acceptable waiting time</td>
<td>16.5</td>
</tr>
<tr>
<td>Interest shown by physicians</td>
<td>93.0</td>
</tr>
<tr>
<td>Ability to ask questions</td>
<td>93.5</td>
</tr>
<tr>
<td>Satisfied with information given</td>
<td>90.1</td>
</tr>
<tr>
<td>Enough consultation time</td>
<td>82.8</td>
</tr>
<tr>
<td>Confidence in health professionals</td>
<td>94.9</td>
</tr>
</tbody>
</table>
4.5 Determining the level of adherence

The Morisky Medication Adherence Scale (MMAS) was used to determine the level of adherence. The MMAS has an adherence score range of 0 to 8; higher scores from 6 indicate better adherence. The mean score was 5.10, with a median of 5 and values ranging from 1 to 8. The results were dichotomized into 2 levels in order to facilitate its use both in clinical and public health practice. By this classification 47.7% of patients had high adherence levels while 52.3% had low adherence levels.

<table>
<thead>
<tr>
<th>Reasons</th>
<th>N=413 (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Forgetfulness</td>
<td>239 (58.7)</td>
</tr>
<tr>
<td>Reasons other than forgetfulness</td>
<td>282 (68.6)</td>
</tr>
<tr>
<td>Feel worse after medication</td>
<td>280 (68.5)</td>
</tr>
<tr>
<td>Travelling or not at home</td>
<td>279 (68.4)</td>
</tr>
<tr>
<td>Took all medications yesterday</td>
<td>58 (14.0)</td>
</tr>
<tr>
<td>Controlled blood pressure</td>
<td>249 (61.0)</td>
</tr>
<tr>
<td>Inconvenience of taking drugs</td>
<td>238 (58.6)</td>
</tr>
<tr>
<td>Difficult to remember</td>
<td>N = 413 (%)</td>
</tr>
<tr>
<td>Never/Rarely</td>
<td>183 (44.3)</td>
</tr>
<tr>
<td>Once in a while</td>
<td>79 (19.1)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>101 (24.5)</td>
</tr>
<tr>
<td>Usually</td>
<td>14 (3.4)</td>
</tr>
<tr>
<td>All the time</td>
<td>36 (8.7)</td>
</tr>
</tbody>
</table>
Fig. 2 Respondents adherence scores

![Bar Chart of Adherence Scores]

Fig. 3 Adherence levels

![Pie Chart of Adherence Levels]

Adherence Levels

- Low Adherence: 47.70%
- High Adherence: 52.30%
4.6 Assessment of adherence to antihypertensive medication

Adherence among the females tended to be higher than that of males even though there was no significant difference. Older respondents, 60 years and above, had high adherence levels compared to the younger respondents. Poor medication adherence was observed more commonly with the divorced and married respondents as against the single and the widowed. Those with formal education as well as the professionals also reported low adherence levels. Those who did not get all their drugs from the NHIS and those who earned more than GH₵601 monthly and spent more than GH₵51 monthly on drugs had poor medication adherence (Table 4.5). Marital status, occupation and monthly income showed significant associations with adherence levels.

Good adherence levels were observed in respondents who had been diagnosed with less than 5 years and more than 10 years of hypertension, those who took a total of 1 and 4 and more antihypertensive tablets daily and those who were not experiencing any side effects. All these factors had significant associations with adherence levels. Respondents who were taking non prescribed drugs had poor adherence levels to their antihypertensive medications’ even though the association was not significant (Table 4.6)
Table 4.6-5 Comparison of socio-demographic factors of patients and adherence

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>High Adherence N = 197 (%)</th>
<th>Low Adherence N = 216 (%)</th>
<th>Pearson chi2 (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65 (44.5)</td>
<td>81 (55.5)</td>
<td>0.911 (1)</td>
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<tr>
<td>Female</td>
<td>132 (49.4)</td>
<td>135 (50.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age(years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 39</td>
<td>10 (37.0)</td>
<td>17 (63.0)</td>
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<td></td>
</tr>
<tr>
<td>40-59</td>
<td>89 (44.3)</td>
<td>113 (55.7)</td>
<td>4.239 (2)</td>
<td>0.120</td>
</tr>
<tr>
<td>≥ 60</td>
<td>98 (53.0)</td>
<td>86 (47.0)</td>
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<td></td>
</tr>
<tr>
<td>Mean(SD)</td>
<td>59.53 (12.53)</td>
<td>56.31 (12.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
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<td></td>
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</tr>
<tr>
<td>Single</td>
<td>33 (55.0)</td>
<td>27 (45.0)</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
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<td>141 (53.6)</td>
<td>9.150 (3)</td>
<td>0.027</td>
</tr>
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<td>Divorced</td>
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<tr>
<td>Widowed</td>
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<td>27 (43.5)</td>
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<td></td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No Formal</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>27 (64.3)</td>
<td>15 (35.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>40 (48.8)</td>
<td>42 (51.2)</td>
<td>7.252 (4)</td>
<td>0.123</td>
</tr>
<tr>
<td>Secondary</td>
<td>87 (47.8)</td>
<td>95 (52.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>41 (39.8)</td>
<td>62 (60.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 (50.0)</td>
<td>2 (50.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>23 (56.1)</td>
<td>18 (43.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trader/Artisan</td>
<td>82 (50.3)</td>
<td>81 (49.7)</td>
<td>10.500(4)</td>
<td>0.033</td>
</tr>
<tr>
<td>Professional</td>
<td>34 (34.0)</td>
<td>66 (66.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>54 (52.9)</td>
<td>48 (47.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4 (57.1)</td>
<td>3 (42.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monthly Income(₵)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 200</td>
<td>55 (57.9)</td>
<td>40 (42.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>201-600</td>
<td>63 (47.0)</td>
<td>71 (53.0)</td>
<td>8.456 (3)</td>
<td>0.037</td>
</tr>
<tr>
<td>601-1000</td>
<td>23 (37.1)</td>
<td>39 (62.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 1001</td>
<td>12 (36.4)</td>
<td>21 (63.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expenditure on Drugs(₵)</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>≤20</td>
<td>24 (48.0)</td>
<td>26 (52.0)</td>
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</tr>
<tr>
<td>21-50</td>
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<td>37 (48.1)</td>
<td>40 (51.9)</td>
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<tr>
<td>≥ 100</td>
<td>20 (44.4)</td>
<td>25 (55.6)</td>
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</tr>
<tr>
<td><strong>Drugs from NHIS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73 (50.7)</td>
<td>71 (49.3)</td>
<td>0.795 (1)</td>
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<td>No</td>
<td>124 (46.1)</td>
<td>145 (53.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Missing values present
Low adherence levels was observed, in respondents who thought they were suffering from complications of hypertension (58.7%), among those who did not believe their medications were effective in reducing their blood pressure levels (59.4%) and for respondents who had to be reminded to take their drugs as scheduled (53.6%). Adherence was also poor for those who felt that their hypertension was not under control and for those who do not follow the advice of their physicians and these had significant associations with adherence levels (Table 4.6).

Poor adherence was significantly associated with waiting time at the clinic amongst respondents who found waiting time at the clinic unacceptable as well as those who said they did not spend enough time with their physicians during consultation (Table 4.6). Low adherence levels was observed in respondents who said their doctors showed interest during consultation (51.3%) and those who said the doctors did not show interest (65.5%). Those who were not given the chance to state their problems and ask questions about hypertension (59.3%), and those who had the chance to ask questions (51.8%) both reported low adherence levels. Respondents who were not satisfied with the health information and advice provided by the doctor and other health professionals had lower adherence levels (65.9%) as compared to those who were satisfied with the health information (50.8%). Adherence was lower in respondents who did not have confidence in their doctors and other health professionals (66.7%) as compared to those who had confidence (51.5%).
Table 4.6-6 Comparison of patient variables with adherence

<table>
<thead>
<tr>
<th>Variables</th>
<th>High Adherence N=197 (100%)</th>
<th>Low Adherence N=216 (100%)</th>
<th>Pearson chi2 (df)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration of illness (yrs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5</td>
<td>72 (50.7)</td>
<td>67 (49.3)</td>
<td></td>
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</tr>
<tr>
<td>5 to 10</td>
<td>55 (38.5)</td>
<td>90 (61.5)</td>
<td>7.625 (2)</td>
<td>0.022</td>
</tr>
<tr>
<td>&gt;10</td>
<td>70 (54.3)</td>
<td>59 (45.7)</td>
<td></td>
<td></td>
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<td><strong>No. of tablets taken daily</strong></td>
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</tr>
<tr>
<td>1</td>
<td>25 (53.2)</td>
<td>22 (46.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>59 (37.8)</td>
<td>86 (62.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>52 (47.7)</td>
<td>60 (52.3)</td>
<td>12.071 (5)</td>
<td>0.034</td>
</tr>
<tr>
<td>4</td>
<td>31 (53.4)</td>
<td>27 (46.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>15 (69.6)</td>
<td>8 (30.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>15 (57.1)</td>
<td>13 (42.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Side Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49 (41.4)</td>
<td>70 (58.6)</td>
<td>7.076 (2)</td>
<td>0.029</td>
</tr>
<tr>
<td>No</td>
<td>143 (52.2)</td>
<td>122 (47.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>5 (29.2)</td>
<td>24 (70.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non Prescribed Drugs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>60 (43.7)</td>
<td>76 (56.3)</td>
<td>1.154 (1)</td>
<td>0.283</td>
</tr>
<tr>
<td>No</td>
<td>137 (49.4)</td>
<td>140 (50.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perception of control of BP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>174 (49.9)</td>
<td>178 (50.1)</td>
<td>4.957 (1)</td>
<td>0.026</td>
</tr>
<tr>
<td>Poor</td>
<td>23 (34.4)</td>
<td>38 (65.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Follow advice of physician</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>172 (51.2)</td>
<td>164 (48.8)</td>
<td>8.803 (1)</td>
<td>0.003</td>
</tr>
<tr>
<td>No</td>
<td>25 (32.5)</td>
<td>52 (67.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Waiting time at clinic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>40 (58.8)</td>
<td>28 (41.2)</td>
<td>4.038 (1)</td>
<td>0.044</td>
</tr>
<tr>
<td>Poor</td>
<td>157 (45.5)</td>
<td>188 (54.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time spent with physician</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>172 (50.3)</td>
<td>170 (49.7)</td>
<td>5.360 (1)</td>
<td>0.021</td>
</tr>
<tr>
<td>Poor</td>
<td>25 (35.2)</td>
<td>46 (64.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>197</td>
<td>216</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.7 Factors that contribute to adherence

In an initial analysis using chi square test to determine associations between adherence and independent variables, marital status, occupation, monthly income, duration of illness, side effects, number of antihypertensive tablets taken daily, belief that hypertension is under control, ability to follow the advice of physicians; waiting time at the clinic and time spent with physician were associated with adherence levels. Unadjusted logistic models showed that marital status, occupation, duration of illness, control of blood pressure, following the advice of physicians and time spent with physician were associated with adherence to varying extents (Table 4-7). The divorced, trained professionals, respondents who had been diagnosed hypertensive between 5 to 10 years ago were the categories associated with poor adherence whilst good control of blood pressure, ability to follow the advice of physicians and enough time spent during consultation were associated with good adherence (Table 4-7).

The employed and retired had less odds of being adherent compared to the unemployed. Compared with those who had been hypertensive for less than 5 years the odds of those diagnosed between 5 to 10 years ago was about 0.61(95%CI 0.38-0.98) times whilst the odds for those who had been hypertensive for more than 10 years was 1.15(95%CI 0.71-1.86). The odds of those not experiencing side effects were about 1.55(95%CI 0.98-2.43) times that of those experiencing side effects. Increasing number of total antihypertensive tablets taken daily increased odds of adherence but the odds of taking 6 antihypertensive tablets daily was less than the odds of taking 5 tablets daily (Table 4-7).
Significant associations with adherence to medications was found with those who believed their blood pressure was under control, those who followed the advice of their physicians, those who found waiting time acceptable and those who spent enough time with their doctors (Table 4.7).

All independent variables which showed significant associations with adherence level were entered into a multiple logistic model. After this adjustment, only marital status was associated with levels of adherence (Table 4.7). The divorced, OR 0.19 (95%CI: 0.06-0.65), were 81% likely to be less adherent than the single respondents.
Table 4.7-7 Factors associated with adherence to antihypertensive drugs

<table>
<thead>
<tr>
<th>Dependent variable: Adherence level (0 = Low, 1 = High)</th>
<th>Unadjusted OR (95% CI)</th>
<th>p-value</th>
<th>Adjusted OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>Ref</td>
<td>0.230</td>
<td>Ref</td>
<td>0.420</td>
</tr>
<tr>
<td>Married</td>
<td>0.71 (0.40, 1.24)</td>
<td>0.230</td>
<td>0.76 (0.38, 1.49)</td>
<td>0.420</td>
</tr>
<tr>
<td>Divorced</td>
<td>0.27 (0.10, 0.74)</td>
<td>0.011</td>
<td>0.19 (0.06, 0.65)</td>
<td>0.008</td>
</tr>
<tr>
<td>Widowed</td>
<td>1.06 (0.52, 2.16)</td>
<td>0.872</td>
<td>0.76 (0.33, 1.78)</td>
<td>0.529</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>Ref</td>
<td></td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Trader/Artisan</td>
<td>0.79 (0.40, 1.58)</td>
<td>0.508</td>
<td>1.28 (0.58, 2.86)</td>
<td>0.540</td>
</tr>
<tr>
<td>Professional</td>
<td>0.40 (0.19, 0.85)</td>
<td>0.017</td>
<td>0.70 (0.29, 1.68)</td>
<td>0.422</td>
</tr>
<tr>
<td>Retired</td>
<td>0.88 (0.42, 1.83)</td>
<td>0.732</td>
<td>1.16 (0.48, 2.78)</td>
<td>0.741</td>
</tr>
<tr>
<td>Other</td>
<td>1.04 (0.21, 5.27)</td>
<td>0.959</td>
<td>1.22 (0.21, 6.99)</td>
<td>0.826</td>
</tr>
<tr>
<td><strong>Duration of Illness (yrs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5</td>
<td>Ref</td>
<td>0.039</td>
<td>Ref</td>
<td>0.305</td>
</tr>
<tr>
<td>5 – 10</td>
<td>0.61 (0.38, 0.98)</td>
<td>0.039</td>
<td>0.75 (0.43, 1.30)</td>
<td>0.305</td>
</tr>
<tr>
<td>&gt;10</td>
<td>1.15 (0.71, 1.86)</td>
<td>0.563</td>
<td>1.40 (0.75, 2.59)</td>
<td>0.288</td>
</tr>
<tr>
<td><strong>Side Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>Ref</td>
<td>0.060</td>
<td>Ref</td>
<td>0.075</td>
</tr>
<tr>
<td>No</td>
<td>1.55 (0.98, 2.43)</td>
<td>0.060</td>
<td>1.60 (0.95, 2.67)</td>
<td>0.075</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0.58 (0.22, 1.52)</td>
<td>0.268</td>
<td>0.65 (0.22, 1.96)</td>
<td>0.444</td>
</tr>
<tr>
<td><strong>No. of tablets taken daily</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ref</td>
<td>0.067</td>
<td>Ref</td>
<td>0.048</td>
</tr>
<tr>
<td>2</td>
<td>0.53 (0.27, 1.04)</td>
<td>0.067</td>
<td>0.47 (0.22, 0.99)</td>
<td>0.048</td>
</tr>
<tr>
<td>3</td>
<td>0.80 (0.41, 1.60)</td>
<td>0.532</td>
<td>0.80 (0.37, 1.73)</td>
<td>0.575</td>
</tr>
<tr>
<td>4</td>
<td>1.01 (0.47, 2.18)</td>
<td>0.979</td>
<td>0.75 (0.31, 1.80)</td>
<td>0.523</td>
</tr>
<tr>
<td>5</td>
<td>2.01 (0.70, 5.79)</td>
<td>0.195</td>
<td>2.48 (0.72, 8.53)</td>
<td>0.149</td>
</tr>
<tr>
<td>6</td>
<td>1.17 (0.46, 3.01)</td>
<td>0.740</td>
<td>1.04 (0.36, 3.00)</td>
<td>0.942</td>
</tr>
<tr>
<td><strong>Perception of control of BP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Ref</td>
<td>0.028</td>
<td>Ref</td>
<td>0.259</td>
</tr>
<tr>
<td>Yes</td>
<td>1.89 (1.07, 3.34)</td>
<td>0.028</td>
<td>1.45 (0.76, 2.78)</td>
<td>0.259</td>
</tr>
<tr>
<td><strong>Follow Advice of Physician</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Ref</td>
<td>0.003</td>
<td>Ref</td>
<td>0.129</td>
</tr>
<tr>
<td>Yes</td>
<td>2.18 (1.29, 3.68)</td>
<td>0.003</td>
<td>1.61 (0.87, 2.99)</td>
<td>0.129</td>
</tr>
<tr>
<td><strong>Waiting time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>Ref</td>
<td>0.046</td>
<td>Ref</td>
<td>0.061</td>
</tr>
<tr>
<td>Good</td>
<td>1.71 (1.01, 2.90)</td>
<td>0.046</td>
<td>1.83 (0.97, 3.44)</td>
<td>0.061</td>
</tr>
<tr>
<td><strong>Time Spent with physician</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>Ref</td>
<td>0.022</td>
<td>Ref</td>
<td>0.091</td>
</tr>
<tr>
<td>Good</td>
<td>1.86 (1.10, 3.17)</td>
<td>0.022</td>
<td>1.73 (0.92, 3.29)</td>
<td>0.091</td>
</tr>
</tbody>
</table>
CHAPTER FIVE

5.0 DISCUSSION

5.1 Summary of objectives

The aim of the study was to determine the level of adherence to antihypertensive medications and determine factors contributing to the level of adherence including the use of non prescribed medications in hypertensive patients attending the Korle-bu OPD clinic.

5.2 Key findings of the study

This study showed that there were almost equal numbers of people who were adherent (47.7%) and non adherent (52.3%). Marital status, occupation, duration of illness, side effects, number of antihypertensive tablets taken daily, belief that hypertension is under control, ability to follow advice of physicians, waiting time at the clinic and time spent with physician influenced the odds of adherence. After adjusting for the other factors marital status was significantly associated with adherence levels whilst the other factors were not.

5.3 Comparison of key findings with literature

5.3.1 The level of adherence among antihypertensive users

There are very few published literature on adherence to antihypertensive medications in Ghana but several studies in both developing and developed countries have published adherence levels in varied settings hence the study was compared to some of them.
This study showed an adherence level of 47.7% compared to an adherence level of 7% reported in a study conducted in Ghana amongst 121 patients attending the Komfo Anokye Teaching Hospital hypertensive clinic between December 2001 and April 2002 (Buabeng et al., 2004) and another study conducted in Bangladesh which reported an adherence rate of 15% (Hussain et al., 2011). Another study conducted amongst hypertensive outpatients at a tertiary hospital in Zimbabwe reported an adherence rate of 40.2% (Mukora-Mutseyekwa & Chadambuka, 2013). A similar study done in a teaching hospital in Nigeria reported a higher adherence level of 85.5% (Okoro & Ngong, 2012). Other studies that reported higher adherence level include a study conducted in Northwest Ethiopia on 384 patients on follow up at University of Gondar Referral Hospital which reported an adherence level of 64.6% (Ambaw et al., 2012) and another in China which reported an adherence level of 65.1% (G. K. Y. Lee et al., 2013).

5.3.2 Factors contributing to level of adherence

Marital status was the most significant factor to adherence levels. This was similar to the findings in a study conducted amongst 636 hypertensive individuals from the Duke University Medical Centre in Durham (Trivedi et al., 2008) and a study conducted in Nigeria (Okoro & Ngong, 2012) both of which reported higher adherence levels with marital status. In this study however even though marital status was associated with poor adherence levels the married and divorced patients had the worse adherence compared to the single and widowed patients. This seems to indicate the competing needs at home such as care for offspring or elderly and professional jobs rather than marriage itself. It could also probably be due to a self denial state in which the divorced live thus not being bothered about the issues of health and life. Lack of financial support from a spouse
could also be a reason for low adherence levels. This makes a case for continuous public health education for both old and new hypertensive cases since the changing circumstances of life could influence an individual’s level of adherence.

Adherence levels were influenced by occupation of respondents even though it was not statistically significant. This was consistent to a study conducted in an outpatient clinic located in the New Territories Region of Hong Kong amongst 1114 hypertensive Chinese patients to determine adherence levels in which occupation was associated with adherence levels (Lee et al., 2013) but in contrast to a study done in Seychelles (Bovet et al., 2002). The professional group showed lower adherence to medications compared to the unemployed and this could be due to forgetfulness amidst their tight work schedules and other social engagements (Osamor & Owumi, 2011). The traders/artisans and retired had better adherence levels as compared to the professionals. This could be due to the good financial status of the traders hence their ability to afford all their medications. It could also be due to their quest to achieve and maintain good BP control to avoid complications setting in. The good adherence levels of the retired compared to the unemployed could be due to full assessment of their medications from the NHIS and their less stressful schedules which make them not miss doses. Those aged 60 years and above had good adherence levels (53%) which is supported by literature as increasing age has been associated to high adherence levels in a lot of studies (Hashmi et al., 2007, Okoro & Ngong, 2012).

Monthly income was associated with poor adherence to medication. People are generally reluctant in stating their monthly income in the Ghanaian community hence a lot of missing values was obtained. Most traders operate on daily basis and make daily profits
which they spend by the end of the day, hence their inability to state their monthly income. The variable was therefore not included in the multivariate model to prevent distortion of the results.

Duration of illness also contributed to adherence levels. The rate of adherence was higher in those patients who had been diagnosed for more than 10 years and low for those who had been diagnosed between 5-10 years. This might partially be due to the fact that the younger generations are more afraid of taking lifelong medications, looking at their productive years ahead, than the older age groups. This could probably be related to the symptom free nature of hypertension and lack of knowledge. It could also be that the course of the disease is usually more severe in the old age group hence their high adherence. Patients with a longer duration of illness could also have gained more experience with hypertension and thus become more knowledgeable about their own health condition and the disease and its appropriate management (Svensson S. et al., 2000). This finding contrasts what was reported in New Orleans (Hyre et al., 2007) but similar to that observed in Bangladesh (Hussanin et al., 2011). In this finding almost half of the respondents were aged 40-59 years who had low adherence levels and this makes a consideration for early and intensive health education for new groups of hypertensive patients to improve their adherence status.

Absence of medication side effects improved adherence levels. This may indicate their relative tolerability to hypertensive medications or some forgetting about initial and non persistent side effects. Medication side effects are reported in most literature as a significant reason for non adherence. A study to determine compliance to medication among hypertensive patients in the Murtala Mohammed Specialist Hospital, Kano,
Nigeria gave similar results (Kabir et al, 2004) likewise another in Portugal (Morgado et al, 2010). It was however in contrast to another study done in Nigeria (Eo, Up, & Am, 2010).

Total number of antihypertensive tablets taken daily influenced adherence with an increase in adherence as number of tablets increased. This could be due to the knowledge that a combined therapy achieves better control of blood pressure than monotherapy as some drugs work synergistically. It could also be that those with a higher number of tablets perceive themselves as more ill hence their higher levels of adherence especially in those aged 60 years and above who also reported good adherence. This was similar to studies done in Brazil (Ungari & Fabbro, 2010) and in Nigeria (Okoro & Ngong, 2012) and inconsistent with a study done in Malaysia (Paraidathathu et al, 2012).

Patients’ belief that their blood pressure was under control coupled with the motivation and advice from doctors and health professionals increased levels of adherence. This was similar to a study conducted in three district hospitals in Dar es Salaam (Joho, 2013) in which patients’ perception of benefit was significantly associated with higher levels of adherence. A patient’s perception about health is likely to have a strong influence on adherence levels; it is therefore possible that to maintain good control there has to be good adherence to medication. Since patients highly regard advice from doctors and health professionals as significant motivators’, public health education should be enhanced to promote adherence and also to educate the public on the possible causes and complications of hypertension especially when about a third of the respondents in this study had no knowledge of its causes.
Generally assessment of quality of care was very high which ultimately leads to good adherence. Patients were content with the time they spent with their doctors and other health professionals. This could possibly be due to the reason that patient’s adherence to medications increases when they are actively engaged in their own care plan and when consultation takes place in a congenial atmosphere. A study done in Greece showed that a more personal relationship with the doctor facilitated adherence to the treatment (Tsiantou, 2010). Another qualitative study done in Spain showed that low physician–patient interaction made most patients non-compliant to medication (Gascón et al., 2004). Even though waiting time had an association with good adherence, majority of the respondents found waiting time at the clinic unacceptable. Most patients always have other priorities in their daily lives and due to their work and other commitments may not be able to afford to wait for hours in the clinic before being attended to. This in effect would most likely lead to patients not getting prescriptions for medications and also treatment for uncontrolled blood pressure thus reducing adherence levels and increasing the risk for complications.

5.3.3 Factors not contributing to adherence

The findings showed that there were more female respondents than the males in the study with the females having higher adherence levels. Most of the respondents were aged 40 years and above. This is not surprising as hypertension is largely seen in adult life probably due to the stress and unhealthy eating habits of the middle aged working class. Though there was no significant association between age and adherence those aged 60 years and above had higher adherence levels compared to the younger generation who had poor adherence levels.
The level of education of respondents showed rather surprising results of those with no formal education rather having higher adherence levels compared to adherence levels of those with formal education. This was consistent with the findings in the study by Bovet et al, which found that higher levels of education was not associated with higher levels of medication adherence (Bovet et al., 2002). An educated person is ideally associated with better understanding of health information and the importance of adhering to their medications. This could likely be due to the educated taking their medications only when they start feeling worse thus the results of low adherence. It could also be an indication that people with low education might be more easily motivated to treatment by doctors and other healthcare personnel. These demographic findings were consistent with the findings in the study conducted in Brazil (Ungari & Fabbro, 2010) where no significant associations were found between adherence levels and sex, age and education and inconsistent with the studies done in Ethiopia (Ambaw et al, 2012) and in Nigeria (Eo et al., 2010) where significant associations were observed with education.

The greater majority of respondents did not get all their drugs from health insurance but the few who got all their drugs had higher adherence levels than their colleagues. This shows that free supply of drugs could improve adherence levels especially where the results from this study showed higher adherence levels with the unemployed. This is consistent with a study done by Adedapo et al in Nigeria which showed that free drugs could help improve adherence levels (Adedapo et al, 2012) and inconsistent to a study done by Salako et al also in Nigeria which showed that the availability of free drug alone is not enough to improve adherence to antihypertensive medications (Salako et al, 2003).
Most of the respondents, about a third, did not state their monthly expenditure on drugs. This attitude is quite common in Ghana where people hardly disclose how much they earn and their monthly expenditure. Periodic buying and availability of some of the drugs from NHIS makes it difficult for them to calculate monthly expenditure. However for those who responded adherence was higher for those who relatively earn less.

For respondents who took non prescribed medications, adherence to hypertensive medications was poor and majority of them took herbal preparations. Reasons for taking non prescribed medication could be that the respondents believe herbal preparations augments orthodox medication to cure hypertension and this could help stop the continuous use of antihypertensive medication. It also could be due to financial reasons where people would rather buy the cheaper herbal preparations than the expensive orthodox tablets for which they could not afford the full prescription. A study done in Ghana by Buabeng et al cited unaffordable drug prices as the main reason for non compliance (Ohene Buabeng et al 2004). A qualitative study done in Southwestern Nigeria also gave reasons such as high cost of orthodox medications and services in hospitals and the frequency of drug intake as some of the reasons why some patients resorted to the use of traditional medicines and consequently non adherence (Osamor & Owumi, 2011) Another study in Kenyatta cited the use of herbal therapy as one of their perceived reasons for non adherence (Achieng, 2008). Use of non prescribed orthodox tablets such as vitamin and mineral supplements could also influence adherence levels since a feeling of good control of blood pressure could lead to low adherence with prescribed medications.
5.4 Limitations of study

The study was conducted in a tertiary setting where most hypertensive patients with uncontrolled blood pressure levels and complications would be referred to for proper management and therefore it cannot be assumed that the responses expressed here would be similar to those in other primary and secondary settings. It cannot also be applied to those who have difficulties accessing health care in general.

As a cross sectional study it is unable to establish the temporal association between the identified factors and adherence levels.

Patients could be overestimating their adherence levels using the self-report with socially acceptable responses and since it depends largely on an individual’s memory recall bias is possible.

The factors identified in this study represent some of the many factors that contribute to adherence levels in hypertensive patients.
CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSION

The study indicated that level of adherence to antihypertensive medications was 47.7%. Identified factors which affected adherence levels were marital status, occupation of patients, patients’ monthly income, duration of diagnosis, side effects, total number of antihypertensive tablets taken daily, perception of benefit, motivation to follow advice given by health professionals, waiting time at the clinic and time spent with the doctor and other health professionals during consultation.

Marital status was the most significant factor associated with antihypertensive drug adherence.

It is very important therefore to stress the benefits of hypertension treatment and the risks of developing complications if patients do not comply with their treatment and medication schedules. More medication adherence enhancing strategies should be focused on groups at risk of poor adherence; which turned out to be the middle aged, those working as professionals and those with lesser years of hypertension in this study, to improve outcomes. Further research studies can be done in the future to identify reasons for non adherence.

6.2 RECOMMENDATIONS

Considering the overall low adherence rate a team approach involving all health professionals will be an advantage to design better strategies for optimal adherence.
Other health professionals could lead such teams due to the high patient load on doctors.

Health care professionals in hypertensive clinics;

1. Should educate hypertensive patients on the disease condition with emphasis on its causes, severity, their medications and the consequences of non adherence with treatment especially with new patients

2. Need to stress that drug treatment is for life, doses should not be skipped nor medications stopped.

3. Need to discourage hypertensive patients from the use of non prescribed medication as a complement or alternate source to manage the condition.

4. Need to stress on the importance of treatment adherence regardless of the absence of symptoms.

Healthcare Institutions (Korle-Bu Teaching Hospital)

1. Could make waiting areas more comfortable and waiting time occupied with interesting health education and promotion features especially for the elderly.
REFERENCES


APPENDIX 1: CONSENT FORM

CONSENT FOR PARTICIPATION IN A STUDY

FACTORS INFLUENCING ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS AMONGST PATIENTS ATTENDING KORLE-BU TEACHING HOSPITAL

Thanks for showing interest in participating in this study. I am Jennifer Gertrude Laryea a Master of Public Health student of the School of Public Health, University of Ghana, Legon. I am undertaking this study to find the level of adherence amongst hypertensive patients in this hospital and factors that contribute to the level of adherence to their medications prescribed by health professionals. I can be contacted on 0244-672557 or at jen coco ke@ hotmail.com

Participation in this study is absolutely voluntary. Whatever information you provide is totally confidential, limited to the purpose of this study and will not be disclosed to anyone. You have the right to change your mind at any time. The answers you give will not be used against you in the facility where you seek medication. We would thus be very grateful if you give answers which show a true reflection of your medication taking. If you agree to take to take part in this study please append your signature or thumbprint to indicate your consent.

………………………………  ………………….  ………………          …………….
Name of participant                     Signature                    Thumbprint                 Date

………………………………….    ……………………………    ………………………
Name of researcher                                 Signature                                   Date
APPENDIX 2: QUESTIONNAIRE

Respondent’s Identification Number..............................................

Interviewer code.....................................................

Section 1: Socio-Demographics of Patients


2. What is your age? 

3. What is your marital status?

4. What is your level of education?
   [5] Other

5. What is your occupation?
   [5] Other

6. How much is your monthly income?
   [4] more than ¢ 1500

7. How do you pay for your hypertensive drug?
   [5] Other

8. How much do you spend on your drugs monthly? 

9. Do you get all your drugs from the Health Insurance?
SECTION 2: Knowledge about Hypertension and Treatment

10. How long ago were you diagnosed as hypertensive?
   ..........................................................

TICK ALL THE ANSWERS THAT APPLY

11. What do you think are the causes of hypertension?

12. What do you think are the complications of hypertension?
   ..........................................................

13. Which oral anti-hypertensive drug are you currently taking?
   [1]. Diuretics e.g. Bendroflumethiazide, Hydrochlorothiazide
   [2]. Calcium-channel blocker e.g. Nifedipine, Amlodipine, Felodipine
   [3]. Beta-Adrenoceptor blocking drug e.g. Atenolol, Propranolol, Bisoprolol, Carvedilol
   [4]. Angiotensin-converting enzyme inhibitors (ACE) & Angiotensin-II-receptor blockers e.g. Lisinopril, Ramipril, Candesartan, Losartan, Valsartan
   [5]. Methyldopa
   [6]. Other, Specify
   ..........................................................

14. What is the total number of anti-hypertensive tablets you take daily?  

15. How many times in a day do you take your drugs?

16. Do you experience any side effects when taking your anti-hypertensive drugs?
17. Apart from hypertension, do you have any of these medical conditions?

7. Others (Specify). ........................................

18. If yes to Q17 what are the total number of pills you take for that condition in a day?


Section 3: Patient’s Beliefs and Motivation


24. Do you have someone reminding you to take your drugs as scheduled? [1] Yes [2] No

25. Are you able to follow the advice given to you by your health professionals? [1] Yes [2] No

If yes, why?

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

If no, why?

..............................................................................................................................
### Section 4: Quality of Care

<table>
<thead>
<tr>
<th>Question on Quality of care</th>
<th>Yes=1</th>
<th>No=2</th>
<th>DK=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>26. Do you find waiting time at the clinic acceptable?</td>
<td></td>
<td></td>
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<tr>
<td>27. Do your doctors and other health professionals show interest during consultations?</td>
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<tr>
<td>28. Are you given the chance to state your problems and ask questions about your disease?</td>
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<tr>
<td>29. Are you satisfied with the health information and advice provided by your doctor and other health professionals?</td>
<td></td>
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<tr>
<td>30. Do you spend enough time with your doctor and other health professionals during consultation?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Do you have confidence in your doctor and other health professionals?</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Section 5: Measurement of Adherence (Moriskys 8 Item Measurement Adherence Scale)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes= 1</th>
<th>No= 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. Do you sometimes forget to take your medicines?</td>
<td></td>
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<tr>
<td>33. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past two weeks was there any days when you did not take your medicine?</td>
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<tr>
<td>34. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?</td>
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<tr>
<td>35. When you travel or leave home, do you sometimes forget to bring along your medicine?</td>
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<tr>
<td>36. Did you take all your medicines yesterday?</td>
<td></td>
<td></td>
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<tr>
<td>37. When you feel like your blood pressure is under control, do you sometimes stop taking your medicine?</td>
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<tr>
<td>38. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?</td>
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<tr>
<td>39. How often do you have difficulty remembering to take all your medicine? A. Never/rarely</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Once in a while</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Usually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. All the time</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

80