Patterns and Characteristics of Hypertension Pharmacotherapy in Zimbabwe

By

Petmore Mudziwepasi

R985453A

A dissertation submitted in partial fulfilment of the requirements for the

MASTER OF SCIENCE IN CLINICAL PHARMACOLOGY

NOVEMBER 2014

CLINICAL PHARMACOLOGY

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF ZIMBABWE
DEDICATIONS

To

All chronic pharmacotherapy users

And

My family

To whom so much is owed

More than can ever be repaid
DECLARATION

I, Petmore Mudziwepasi do hereby declare that this dissertation is the result of my own investigation and research, except to the extent indicated in the Acknowledgement, References and by comments included in the body of the report, and that it has not been submitted in part or in full for any other degree to any other university.

………………………………… ........................................

Student’s signature Date

I have supervised and read this dissertation. I am satisfied that this is the original work of the author in whose name it is being presented. I confirm that the work has been completed.

……………………………………………………………. ……………………………

Supervisor’ signature Date

………………………………………………………………… ........................................

Chairman Department of Clinical Pharmacology Date
ACKNOWLEDGEMENTS

“I can do all things through him who strengtheneth me”

I would like to thank my supervisor, Dr A Matimba for her assistance, encouragement and constructive criticism throughout this research together with Mr S Gavi. Thanks to Prof Nhachi and Dr Khoza for the dissertation clinics, and my classmates.

A special thank you is deserved by all the organisations that participated as well as the participants in their individual capacity, who co-operated so well and so patiently, without them the dissertation would not exist. Much appreciation goes to my uncle Syden Mishi for assisting me with his expertise in research throughout this research. Many thanks go to my cousin Chido Kafurandi for baby seating the kids and my husband Liberty Zibako for moral and financial support.

Thank you very much, may the Lord shine his face upon you.
ABSTRACT

Title: Patterns and Characteristics of Hypertension Pharmacotherapy in Zimbabwe

Background: Hypertension is a non-communicable chronic disease that has been increasing in prevalence in developing countries in the last decade. On a global scale, mortality attributed to hypertension remains high (14%) affecting at least one billion people in the world; and approximately 80 million people in Africa. In Zimbabwe the prevalence of hypertension is currently estimated to be 27% of the total population; which is higher than HIV and Tuberculosis. As such successful management of hypertension is essential to reduce mortality from hypertension and associated complications. Systematic collection of information about hypertension pharmacotherapy is paramount to optimising patient care.

Objectives: The aim of this research was to investigate the patterns and characteristics of hypertension pharmacotherapy. The specific objectives were: (i) to determine the patterns of use of anti-hypertensive drugs, (ii) to determine the commonly experienced adverse effects, (iii) to assess the extent to which patients are compliant with drug therapy, (iv) to ascertain knowledge, attitude and practice about hypertension and drug therapy and (v) to assess drug accessibility.

Methodology: A purposive sampling technique was used to recruit a sample of 400 patients with hypertension aged 18 years and above. The participants were from twenty randomly selected private pharmacies, Harare Central Hospital outpatients’ pharmacy and Parirenyatwa Group of Hospitals outpatients’ pharmacy. A structured questionnaire was used which was administered through interviews by the chief investigator and four trained research assistants. Data was analysed using SPSS- frequencies, descriptive statistics, cross tabulations, hypothesis testing and regression analysis.

Results: Systolic blood pressure of 57% of the participants was not under control. Age, body-mass index, waist size, alcohol taking, smoking, diabetes were some of the key individual characteristics that were found to explain hypertension. Hydrochlorothiazide, Nifedipine, Enalapril, Furosemide, Atenolol, Losartan, Amilodipine and Spinorolactone were the commonly used drugs. The commonly experienced adverse effects included headaches, dizziness, oedema and sexual dysfunction. Although Patients were taking drugs accordingly in terms of dosing and frequency 41% were not persistent. Lack of money and side effects were the main reasons for stopping drugs. Nineteen percent stopped taking medicines when they feel their blood pressure was under control. On assessing knowledge, 34% of the participants did not know that hypertension is not curable. Sixty percent of the patients were not able to mention a single risk factor, complication or preventive measure and 47% did not know the normal range of blood pressure. Only 11% had home BP machines. Thirty-seven percent indicated that they use drugs only for the management of hypertension. Lifestyle modification like diet, exercise, and weight control were being practised by a few people. Herbs were also being used to control HBP. Although drugs were readily available in the private sector, participants cited affordability problems.

Conclusion: The study has shown that current treatment practices to manage hypertension are not adequately controlling the condition in those affected. Intervention programmes which encourage healthy lifestyle, provision and supply of various drugs, patient education, counselling services and a national chronic diseases management policy are required to improve hypertension pharmacotherapy.
# Table of Contents

DEDICATIONS .............................................................................................................................i  
DECLARATION ..........................................................................................................................ii  
ACKNOWLEDGEMENTS ..........................................................................................................iii  
ABSTRACT ..................................................................................................................................iv  
  List of Figures ...........................................................................................................................vii  
  List of Tables .............................................................................................................................vii  
ABBREVIATIONS .....................................................................................................................ix  
CHAPTER ONE ..........................................................................................................................1  
  1.0 Introduction ......................................................................................................................1  
  1.1 Background ......................................................................................................................1  
  1.2 Statement of the Problem ...............................................................................................6  
  1.3 Research Aim and Objectives .......................................................................................6  
  1.4 Research Hypothesis .......................................................................................................7  
  1.5 Justification/Rational for the Research .........................................................................7  
  1.6 Scope of Research .........................................................................................................9  
  1.7 Structure of Dissertation ............................................................................................... Error! Bookmark not defined.  
  1.8 Chapter Summary ........................................................................................................ Error! Bookmark not defined.  
CHAPTER TWO ..........................................................................................................................10  
LITERATURE REVIEW .............................................................................................................10  
  2.0 Introduction ......................................................................................................................10  
  2.1 Therapeutics ..................................................................................................................10  
  2.2 Drug Utilisation and Pharmacoepidemiology .................................................................13  
  2.3 Commonly Experienced Adverse effects ......................................................................17  
  2.4 Compliance/Adherence ..................................................................................................18  
  2.5 Lifestyle modification ....................................................................................................25  
  2.5.1 Dietary Approaches to Stop Hypertension .................................................................25  
  2.5.2 Regular physical activity .........................................................................................27  
  2.5.3 Alcohol intake ...........................................................................................................28  
  2.5.4 Effects of smoking on blood pressure .....................................................................28  
  2.5.5 Body mass index (BMI) ..........................................................................................29  
  2.5.6 Summary of effects of life style modification ...........................................................29  
  2.6 Knowledge, Attitudes and Practices in Hypertension ....................................................30  
  2.7 Medicines Accessibility ..................................................................................................33  
  30  
  29  
  28  
  27  
  26  
  25  
  24  
  23  
  22  
  21  
  20  
  19  
  18  
  17  
  16  
  15  
  14  
  13  
  12  
  11  
  10  
  9  
  8  
  7  
  6  
  5  
  4  
  3  
  2  
  1  
  1 

v
5.0. Discussion .............................................................................................................. 73
  5.1.1. Demographics .................................................................................................... 73
  5.1.2. Hypertension status .......................................................................................... 75
  5.1.3. Pattern of use of hypertension Drugs ................................................................. 75
  5.1.6. Knowledge, attitude and practices .................................................................... 79
  5.1.7. Drug accessibility ............................................................................................... 80
  5.1.8. Regression Model .............................................................................................. 81
  5.1.9. Hypothesis testing .............................................................................................. 81
  5.20. Conclusions ......................................................................................................... 82
  5.2.1. The pattern of use of anti-hypertensive drugs ................................................... 82
  5.2.2. The commonly suspected adverse effects ........................................................ 83
  5.2.3. The extent to which patients are compliant with drug therapy ......................... 83
  5.2.4. Knowledge, attitude and practice about hypertension and drug therapy .......... 83
  5.2.5. Drug accessibility ............................................................................................... 84
  5.3. Recommendations ................................................................................................. 84
  5.4. Limitations of the Study ....................................................................................... 87
  5.5 Areas of further study ............................................................................................. 87
References .................................................................................................................... 88
Appendices ..................................................................................................................... 101

List of Figures

Figure 2.1: Expected Decline in BP by Non-Pharmacological Intervention in HTN ............ 30
Figure 2.2 Conceptual Framework for Drug Accessibility .................................................. 35
Figure 2.3. Conceptual framework for pharmacotherapy .................................................... 39
Figure 4.1. Age categorisation .......................................................................................... 53
Figure 4.2. Status of BP According to the Patient .............................................................. 58
Figure 4.3. Period of Use of Antihypertensive Drugs .......................................................... 59
Figure 4.4.Primacy Categorisation ................................................................................... 60
Figure 4.5.Commonly Suspected Adverse Effects .............................................................. 64
Figure 4.7. Payment Methods .......................................................................................... 70
Figure 4.8. Sources of Drugs .......................................................................................... 70

List of Tables

Table 2.1. Examples of Comparatively ineffectual antihypertensive combinations .............. 12
Table 2.2. Commonly experienced side effects ................................................................. 17
Table 2.3. Factors that reduce compliance to antihypertensive therapy ........................................... 22
Table 2.4. General guidelines to improve patient adherence to antihypertensive therapy .................. 24
Table 3.1 Assessing validity ............................................................................................................. 45
Table 3.2. Assessing reliability ........................................................................................................ 46
Table 4.1. Demographics ................................................................................................................ 54
Table 4.2. Systolic Blood Pressure and Age cross tabulation ......................................................... 55
Table 4.3. Diastolic Blood Pressure and Age cross tabulation ....................................................... 56
Table 4.4. Descriptive Statistics for Age, SBP, DBP and BMI .......................................................... 56
Table 4.5. BP Status in Diabetic Patients ......................................................................................... 57
Table 4.6. BP status in Different BMI Values and Gender .............................................................. 57
Table 4.7. The Commonly Used Antihypertensive Drugs ............................................................... 59
Table 4.8. Cross tabulations of Category of Therapy and SBP ...................................................... 60
Table 4.9. Chi-Square Tests for Category of Therapy and SBP ....................................................... 61
Table 4.10. Symmetric Measures for Category of Therapy and SBP ............................................. 61
Table 4.11. DBP and Therapy category cross tabulation ................................................................. 62
Table 4.12. Chi-Square Tests for DBP and Therapy Category ....................................................... 62
Table 4.13. Symmetric Measures for DSP and Therapy Category ................................................. 63
Table 4.14. Reasons for not Always Taking Drugs ......................................................................... 64
Table 4.15. Non-Pharmacologic Control of HBP ......................................................................... 66
Table 4.16. Knowledge on Hypertension Risk Factors ................................................................. 67
Table 4.17. Knowledge on HBP Complications and Preventive Measures ................................. 67
Table 4.18. What Bothered Patients When they were Diagnosed of HBP ...................................... 68
Table 4.19. Model Summary of SBP ......................................................................................... 72
Table 4.20. Model Summary DBP .............................................................................................. 72
ABBRVIATIONS

ACCOMPLISH Avoiding Cardiovascular events through Combination therapy in Patients Living with Systolic Hypertension

ACEI angiotensin-converting enzyme inhibitor

ADRs Adverse drug reactions

ALLHAT Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial

ARB Angiotensin receptor blocker

BMI Body mass index

BMQ Beliefs about Medicines Questions

BP blood pressure

CCB calcium channel blocker

CDC Centre for Disease Control and Prevention

CNCDs Chronic Non-Communicable Diseases

CVD cardiovascular diseases

DASH Dietary Approaches to Stop Hypertension

DBP diastolic blood pressure

EDLIZ Essential Drug List for Zimbabwe

EVPI expected value of perfect information

HCT Hydrochlorothiazide

HBP High Blood Pressure

HIV Human Immune-deficiency Virus

HTN Hypertension

IPQ Illness Perception Questions

JNC8 the Eighth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure
JNC7 the Seventh Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure

KAP Knowledge, attitude and practice

NICE National Institute for Health and Clinical Excellence

NSAIDs non-steroidal anti-inflammatory drugs

PUFA polyunsaturated fatty acids

PURE Prospective Urban Rural Epidemiology

QALY Quality-adjusted life year

SBP systolic blood pressure

WHO World Health Organization

YPLLs The age-adjusted years of potential life lost

ZNHS Zimbabwe National Health Strategy
CHAPTER ONE

INTRODUCTION

1.0 Introduction

Hypertension (HTN) is not a curable condition but there are many drugs that have been developed for the control of the condition. The chronic therapy of HTN is problematic because the condition in its early stages is asymptomatic hence the effectiveness of the chronic pharmacotherapy depends on the patient’s compliance/adherence with medication and lifestyle modification, which in turn depends on the patient’s knowledge, practices and attitude towards chronic pharmacotherapy. Anti-hypertensive drugs, like other medicines, are not completely free from side effects. The prescribing of HTN drugs is very much individualised as many factors like co-morbidities, age, race affect the choice of drug. Many guidelines have been developed to try and improve chronic pharmacotherapy of HTN. Pharmacoeconomics, in terms of availability and affordability plays a role in chronic pharmacotherapy of HTN. This study aimed to establish the status of pharmacotherapy of HTN in adults in Harare, the Capital city of Zimbabwe, focusing on people with HTN who were using drugs to control it.

1.1 Background

HTN is defined, either a raised systolic blood pressure (SBP), diastolic blood pressure (DBP), or both (>140/90) (Koda-Kimble, et al, 2009). A clinical diagnosis of HTN is based on the mean of two or more properly measured seated blood pressure (BP) measurements taken on two or more occasions. This mean BP is also used to classify the stage of HTN. The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (HBP) seventh report (JNC7) classification includes normal BP(<120/80), preHTN(120-139/80-89) stage 1 HTN (140-159/90-99), and stage 2 HTN (≥160/100). HTN can be classified as either primary (essential) HTN or secondary HTN, from this classification between 90–95% of HTN cases fall under primary HTN implying that it is HBP without clear underlying medical cause
The remainder, that is 5–10% of cases, is considered to be caused by conditions that works from the kidneys, heart, arteries or the endocrine system, hence classified as secondary HTN.

Chronic means lasting a long period of time. An illness may be considered chronic if it has lasted more than three months, or if there is no expectation of curing the condition. A chronic condition is a human health condition or disease that is persistent or otherwise long-lasting in its effects, (Mahmoud 2012). HTN is a chronic condition that typically does not go away after diagnosis. Pharmacotherapy is treatment of disease through the use of drugs (Medical Dictionary, 2014).

The current and long term impact of Chronic Non-Communicable Diseases (CNCDs) is under appreciated among developmental issues, thereby underestimating their economic burden in Sub Saharan Africa. Developing countries including Zimbabwe have overstretched resources in their efforts to improve prevention and treatment of CNCDs, often leaving this responsibility primarily to individuals (Aksnes, 2012). In fact, CNCDs have not received the priority attention in public health policies and programs that commensurate with their disease burden (Aksnes, 2012), and yet, the increasing burden of chronic conditions such as HTN threatens to overwhelm the already over-stretched health services (Alcocer & Cueto, 2008). As a chronic condition with generally slow progression and high prevalence in Africa (46%), the long term impact on health systems is profound (Heethal et al, 2013).

One in every three adult is expected to be affected by HBP globally, translating to more than a billion individuals (Wagner, 2011). As population grows and people age, the cumulative amount of those with uncontrolled HTN rose from 600 million in 1980 to about 1 billion (972 million) in 2008 (Mahmoud 2012).

Premature deaths (death before the age of 75 years) and disabilities are mainly caused by stroke and heart related diseases, which in turn are to a greater extent triggered by HTN. Each year, an estimated 9.4 million deaths are estimated to be attributable to diseases of the heart- cardiovascular (Jones et al, 2010). To make matters worse, prevalence of HTN are highest in Africa at 46% of adults; only 35% among Americans (Heethal et al, 2013). This puts to rest conventional wisdom that cardiovascular are diseases of affluence hence limited cases can be expected from poor regions. The reason behind could be successful multi-
policies, and enhanced access to health care. HTN is associated with at least 7.6 million deaths per year worldwide (13.5% of all deaths), (Chow et al, 2013). HTN is an important public health challenge in both economically developing and developed countries. In India, cardiovascular diseases (CVDs) are estimated to be responsible for 1.5 million deaths annually (Mahmoud 2012). In a multinational study (Prospective Urban Rural Epidemiology (PURE)), only 32.5% of participants were having their BP under control, Zimbabwe participated as a low income country (Chow et al, 2013).

Across the globe, HBP already affects one billion people and becomes increasingly worrisome in developing countries as within the African region where an estimated 80 million adults were affected in the year 2000 (Heethal et al, 2013). Further estimates indicated that given the limited preventive action: by 2025 an estimated 150 million people will suffer from HBP in Africa (Mulazzi et al, 2009). The situation is compounded by lack of statistics especially in sub-Saharan Africa, where it becomes difficult to formulate and justify policy on treating chronic conditions. Where data is available, costs and effects forecasts can be made, as with The American Heart Association they estimated the direct and indirect costs of HBP in 2010 as $76.6 billion (Jones et al, 2010). Given the resource challenge faced by most developing countries in Africa like Zimbabwe, the battle against chronic conditions is far from over and every effort should be put in trying to manage the situation based on the available resources. This calls for investigation to the status quo in terms of chronic therapy of HTN.

In a systematic review done by Kayima et al (2013), it was revealed that there exist low levels of awareness and condition management based on the original articles published in the period 1993-2013 on Africa. The recommendation from the systematic review was for further studies to be carried out to gain better insight on the reasons behind such poor levels of awareness and control so that improvements can be done at policy level. Alwan, (2011) reported that Africa housed a greatest proportion of the world’s cardiovascular diseases (CVD) burden with its population as low as a seventh of the world. Compared to the developed world, age-specific mortality rates from CVDs are way too high in younger age groups (across gender) in Africa. To put the severity of CVD into perspective, it is second from HIV/AIDS as the chief cause of death within the
African continent and is top driver of high mortality of those over thirty years of age (Bertrand, 1999).
World Health Organisation (WHO) forsee an exponential rise in deaths due to CVDs in Africa and postulated that this will increase the economic effects of the CVD (Alwan, 2011).

The estimated prevalence rate for HBP is 27% (Zimbabwe National Health Strategy, 2013(ZNHS)). On WHO’s top twenty causes of death in Zimbabwe HTN is ranked 15 but its end results stroke and coronary heart diseases are two and four(ZNHS,2013). HBP contributes to premature death from heart disease and stroke .Prevalence of HTN in the PURE study was 27.7%, which is similar to the Global Burden of Disease estimates and in which Zimbabwe participated (Chow et al, 2013). The ZNHS (2013) acknowledges that there is increasing burden of NCDs such as HTN in Zimbabwe as is the trend in the rest of developing countries, however the challenge is that there is little effort and resources put to address the underlying factors (ZNHS,2013). Not surprising that, Matenga et al (1997) concluded that awareness, treatment and control of HTN were very low in Zimbabwe.

The prevalence of HTN condition is skewed towards the urbanites and women as reported in Mufunda et al. (2006) on Zimbabwe, adding that the condition correlates strongly and positively with age as well. The sharp distinction on prevalence of HTN in urban than rural was further confirmed in the case of Cameroon, Egypt, Mozambique and Zimbabwe by Damasceno et al, (2009).

According to the Centre for Disease Control and Prevention (CDC) (Aksnes, 2012) the age-adjusted years of potential life lost (YPLLs) for heart disease per 100,000 population aged ≤75 years were higher for blacks (1,969 YPLLs) in 2006. Furthermore blacks also had the highest YPLLs for stroke (432), compared with Hispanics (185), and whites (158) (Aksnes, 2012).

Inadequacies in diagnosis, treatment, and/or control of HBP which is inherent in resource strained countries need to be assessed from time to time (Alcocer, & Cueto, 2008). Over and above resource constrains the health care providers face numerous challenges in reaching right BP levels, among these is resistance by patients to take multiple medications. Given the chronic nature of the condition, patients’ effort is of paramount importance and success of managing HTN condition depends on the attitude and behaviour of the
patient in terms of applying the education received and sticking to medication schedules. Adequate control of BP is of enormous public health importance. The achievement of BP goals is possible, and most importantly, lowering BP significantly reduces the risk of death due to heart disease and stroke, the development of other debilitating conditions, and the cost associated with advanced medical care (Coca, 2008).

Wong et al (2003) asserts that the positive effects of pharmacological treatment for HBP patients are well established. Based on evidence from meta-analyses of randomized placebo-controlled trials there is clear indication that antihypertensive therapy drops the risk of stroke by approximately 30%, coronary heart disease by between 10%-20%, and congestive heart failure an average 40%-50%, and total mortality by 10% (Wong, et al, 2003). Several studies have attempted to quantify the societal costs of uncontrolled HTN in clinical and financial terms and found out that they are voluminous, see for example Lapuerta, (2001); Wong et al (2003); Coca, (2008). Available data indicate that untreated HTN shortens life expectancy by approximately five years and that the estimated lifetime risk of developing HTN is 90 % (Watanabe et al, 2013).

The associated economic burden of HTN is also substantial. The average annual medical care cost for individuals with HTN has been estimated at $3900 (in year 2000 US dollars) in Canada (Maetzel et al, 2004) with similar values ($3787) for the United States (Hodgson & Cai, 2001) The increase in medical care costs is greater for those with moderate-to-severe BP elevation (diastolic BP >104 mm Hg) than for those with mild disease. Studies have demonstrated that poor BP control is associated with greater healthcare costs (Paramore et al, 2001), for example, in the United States, inadequate control of HTN has been estimated to result in 40 000 cardiovascular events, >8000 cardiovascular disease deaths, and approximately $964 million in direct medical expenditures (Flack et al, 2002). Similarly, poor compliance and lack of persistence with BP medications are associated with increased health care costs.

The major thrust of this research is on pharmacotherapy considering that many determinants of HBP such as the production and marketing of tobacco and alcohol as well as exposure to unhealthy diets lie outside the
direct control of the Ministry of Health and Child Welfare. The control and management of HBP should be everyone’s concern given that HTN is a silent killer and successful measures depends on understanding the best management approaches, among other pharmacotherapy. Most of the people affected by HTN are often not aware that they have the disease. The effects of HTN as stated above are far reaching and have wide economic effects at micro and macro level. Unhealthy lifestyles which include unbalanced diet, lack of exercise, and smoking, harmful use of alcohol coupled with stress, all increase the chances of developing HBP.

1.2. Statement of the Problem
Developing countries including Zimbabwe are undergoing an epidemiological transition from infectious and parasitic diseases to CNCDs such as HTN; this requires health systems modifications to address the long-term nature of chronic conditions but is limited by lack of information as it is difficult to define the encumbrance of chronic conditions in areas with limited or no health statistics. To attest to this, to date no known published research has been done in Zimbabwe to establish the chronic pharmacotherapy status of HTN. It is therefore the purpose of this study to close this gap by taking a survey on the chronic pharmacotherapy users living with HTN. Across literature, apposite pharmacological treatment is reported to have significantly reduced morbidity and mortality related to chronic conditions such as HBP. Therefore, this study aims to establish the chronic therapy status of HTN patients in Harare, Zimbabwe’s capital city. Such information will be useful in advising on best ways of managing chronic pharmacotherapy of HTN. Information about chronic pharmacotherapy status benefits patients, service providers and enables evidence based professional practice in medicine.

1.3 Research Aim and Objectives
The aim of this research was to find out the patterns and characteristics of HTN pharmacotherapy. The objectives include to:

1) Determine the pattern of use of anti-hypertensive drugs.
2) Determine the commonly experienced adverse effects.
3) Assess the extent to which patients are compliant with drug therapy
4) Ascerten knowledge, attitude and practice about HTN and drug therapy.
5) Assess drug accessibility.

1.4 Research Hypothesis
The current chronic therapy practices in management of HTN are not adequate for HTN control in Zimbabwe.

1.5 Justification/Rational for the Research
Systematic collection of information about HTN pharmacotherapy is paramount to optimising patient care. Reviewing and evaluation of current status of chronic therapy of HTN will highlight the gaps and inform on which areas in the therapy of HTN needs attention and this will improve knowledge attitude and practice for HTN management. Information found in this research is useful for modification of HTN management through application by health professionals, patients with HTN, policy makers and technology developers.

In 2012, at the WHO World Health Assembly, governments decided to adopt a global target of a 25% reduction in premature death from non-communicable diseases by 2025. This research will contribute towards that goal since there is need to establish the current status of HTN therapy. Annually, World Health Day is celebrated on 7 April with a theme selected to highlight a priority area of public health concern globally. For 2013, HTN control was rightly selected as the theme; signifying the attention that the international body on health, WHO, places on this chronic condition.

This study as any pharmacoepidemiological study, will improve knowledge on effectiveness and safety of medicines unlike clinical trials, pharmacoepidemiology assess drug effects in large, heterogeneous populations. The study on drug utilization is of great significance as the knowledge obtained permeates various spheres of planning and management of the chronic condition. This ranges from national budget allocations, rational use of drugs in populations and to the individual patient. Without pharmacological
information to be obtained from studies like this, it is difficult to initiate a discussion on cogent drug use or to suggest ways of improving prescribing traditions.

Drug utilisation research can increase our understanding of how patients’ attitudes, behaviours and lifestyles compliment the effectiveness of the chemical component of the drug. There is room to determine cases of abuse, resistance and possible substitutes of compliments from real life situations. The study therefore can generate hypotheses that set the agenda for further investigations that is avoiding prolonged irrational use of drugs and provides an opportunity to tap into indigenous knowledge in the management of HTN.

Drug utilisation studies are also often used for hypothesis testing to develop the questions to be addressed in specific prospective evaluations. In this era of evidence-based medicine, quantifying compliance and persistence with HTN therapy will provide additional information to clinicians and other health care decision makers on the full range of factors impacting treatment effectiveness, including patients beliefs, attitudes, and behaviours.

Monitoring of prescriptions and drug utilisation studies could identify the associated problems and provide feedback to prescriber. Developing countries have limited funds available for healthcare and drugs and it becomes very important to prescribe drug rationally so that the available funds can be utilized optimally. Drug utilisation studies are powerful exploratory tools to ascertain the role of drugs in society. They create a sound socio-medical and healthy economic basis for healthcare decision making. Drugs are double edged weapons, no matter how safe and efficacious, are always coupled with inescapable risk of adverse reactions, drug safety assessment should be considered as an integral part of day to day clinical practice. Adverse drug reactions (ADRs) are considered among the leading causes of morbidity and mortality.

HTN is emerging as a major public health problem in many developing countries undergoing epidemiological transition; it is essential to gather both epidemiological and KAP data on HTN as crucial steps in the design of sound prevention and control programs. It is particularly important to maximize the efficiency of such programs to minimize delay in achieving effective HTN control. A cost-effective use of health services to control these emerging chronic diseases is particularly needed in developing countries
because resources are limited and generally must be shared with the concurrent burden of persistent communicable diseases.

Medical non-compliance has been identified as a major public health problem in the treatment of HTN. There is a large research record focusing on the understanding of this phenomenon, to date, the majority of studies in this field have been focused from the medical care perspective, but few studies have focused on the patients’ point of view. Reviews to understand the impacts of specific medications on resource use and costs are important because these results may then be used for formulary committee dossiers, treatment guidelines, and decisions by payers and health authorities.

1.6 Scope of Research

This research assessed chronic pharmacotherapy of HTN in Harare of people who visited the twenty selected private pharmacies, Parirenyatwa Group of Hospitals and Harare Central Hospital outpatient pharmacy. The aspects of pharmacotherapy covered included pharmacoepidemiology, drug utilisation, compliance, pharmaco-economics and how much the chronic people know about their medicines and condition.
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The WHO 1998 resolution WHA 47.12 recognises the key role of pharmacists in public health and the use of medicines. The emphasis is on pharmacists’ duty to provide informed and objective advice on medicines and their use, to promote the concept of pharmaceutical care, and to actively participate in illness prevention and health promotion. Inter alia, the duties include pharmacotherapy, an area of pharmacy practice that is responsible for ensuring the safe, appropriate, and economical use of drugs in patient care. On the other hand, illness prevention and health promotion entails management of chronic conditions like HTN. Management of such conditions is difficult as they are prolonged and in developing economies where resources are constrained adequate care may not be very feasible.

Pharmaceutical care, or a more intensive patient follow-up by the pharmacist, can be described as guaranteeing that the patient uses their medication as correctly, efficiently and safely as possible. The pharmacist, trained as an expert in medicines, is the last health care provider to be in contact with the patient during the start-up or continuation of a drug and at the same time is also the first point of contact with respect to questions about the medicine. Pharmacists can therefore inform and supervise the patient in addition and in consultation with the physician with respect to the correct use of medicines, medication adherence and lifestyle modification (Appel, 2003).

2.1 Therapeutics

According to the JNC8, nonblack population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, calcium channel blocker
(CCB), angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB). In the general black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB. The main objective of HTN treatment is to attain and maintain goal BP and prevent end organ damage. If goal BP is not reached within a month of treatment, the dose is increased or a new second drug from thiazide-type diuretic, CCB, ACEI, or ARB is added. The clinician should continue to assess BP and adjust the treatment regimen until goal BP is reached. If goal BP cannot be reached with two drugs, a third drug from the list provided is added in a titrating manner. ACEI and an ARB should not be used together in the same patient.

If goal BP cannot be reached using the drugs that are in the four groups because of a contraindication or the need to use more than three drugs, antihypertensive drugs from other classes can be used. For patients without a compelling indication for a particular drug class, on the basis of comparative trial data, availability, and cost, a low dose of thiazide diuretic should be considered for initiation of therapy (Blankart, 2011). Flack et al (2010) clearly favoured use of chlorthalidone over HCT citing numerous reasons; among others that chlorthalidone effectively depresses BP than Hydrochlorothiazide (HCT) on a mg per mg basis. Furthermore Ernst et al (2006) added asserts that when comparing at night time, chlorthalidone also lowers BP more effectively.

On the other hand, Flack et al (2010) points out the need to use combination of antihypertensive drug treatment as a means to keep BP within desired target levels. This is more so when BP is more than 15/10 mmHg above target levels. Given that this chronic condition is a danger to some organs; such combined drug therapy should be applied with caution to protect target organs in the high risk population groups. It is imperative to note that the response to treatment more often depend on the population characteristics, with Wright et al
(2005) reporting that, monotherapy with a thiazide diuretic or a calcium channel antagonist has reliably helped control BP more effectively than \( \beta \)-blockers, ACE inhibitors, and ARB among the African Americans. To these Mokwe et al. (2004) said \( \beta \)-blockers have assisted in lowering BP, quiet reliably among Whites than African Americans.

Most patients with HTN will require two or more antihypertensive drugs to control their BP (Chobanian et al, 2003). However regardless of the supposedly beneficial effects of individual drug effects, when combined there are classes that are comparatively weak and thus should be avoided. This ineffectiveness can be explained by impotence of target of antihypertensive treatment and may also result from an indirect decrease of BP-lowering effects. Even though there are such experiences of weakened effect of combined drug classes, there are instances where their use is still justified (Flack et al. 2010). For example when there is co-existence of coronary artery disease or heart failure. Too much drug combination may adversely affect adherence and BP control among people on three or more drugs compared to those on two drugs (Nelluri & Jampani, 2014).

### Table 2.1: Examples of Comparatively ineffectual antihypertensive combinations

<table>
<thead>
<tr>
<th>Combination</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor + ARB</td>
<td></td>
</tr>
<tr>
<td>( \beta )-Adrenoceptor antagonist + ACE inhibitor or ARB</td>
<td></td>
</tr>
<tr>
<td>( \beta )-Adrenoceptor antagonist + central adrenergic inhibitor (e.g. clonidine)</td>
<td></td>
</tr>
<tr>
<td>( \alpha )-Adrenoceptor antagonist + central adrenergic inhibitor</td>
<td></td>
</tr>
<tr>
<td>( \beta )-adrenoceptor antagonists plus non-dihydropyridine calcium channel antagonists</td>
<td>should be avoided because both drugs have negative inotropic and chronotropic effects on the myocardium</td>
</tr>
</tbody>
</table>

Source: (Nelluri & Jampani, 2014)

Patients with diabetes mellitus have a high risk of cardiovascular disease, and the latter is the leading cause of premature mortality in diabetic patients. Treatment of risk factors and comorbidities, such as HTN, is very important and may effectively prevent cardiovascular events. The BP goal in diabetic patients should be below 140/90 mmHg (JNC8, 2014), to reach this BP goal, intensive lifestyle intervention and often combinations of different antihypertensive drugs must be initiated. In combination treatment, a blocker of the ARB
should be included, and according to the results of the ACCOMPLISH trial (The Avoiding Cardiovascular events through Combination therapy in Patients Living with Systolic HTN); a combination of an ARB and a calcium channel blocker should probably be the first choice (Aksnes et al, 2012).

In practice, countries have different recommendations with regards to pharmacotherapy. For example, according to JNC 8 guidelines in the US diuretics are the recommended first line treatment whereas the UK National Institute for Health and Clinical Excellence (NICE) guideline for 2011 prescribes ACEI or a low cost ARB as step one antihypertensive treatment in adults below 55 years of age and for the over 55’s the guideline recommends calcium channel blockers (CCBs). The latter’s advice is that thiazide is to be used only if CCBs are not suitable for example when a patient has edema or has a high risk of developing heart failure. In a certain study diuretic were prescribed (17%) and CCB (33.83%) (Slonki et al, 2013). Essential Drug List for Zimbabwe (EDLIZ, 2011), recommend HCT and atenolol as first line and captopril, enalapril, nifedipine and prazosin as second line

2.2 Drug Utilisation and Pharmacoepidemiology

Drug utilization studies can be targeted towards the processes of drug use. This according to Elliot and Marriott (2009) could be for example checking the kind of drugs used, the manner they are used and if such usage is in compliance with relevant guidelines. Such information can be obtained from cross sectional studies. WHO (1977) defined drug utilization research as investigating the marketing, distribution, prescription, as well as drugs usage within a society, with particular attention given to the eventual medical, social and economic consequences.

There is a possible link between drug usage and pharmacoepidemiology which Tilson (2004) defined as the study of the use and healing results and ADRs among significant proportion of the population aimed at supporting purposive and economical drug utilisation in the
population that improves health outcomes. Pharmacoepidemiology can be focused on drugs where safety and effectiveness of individual drugs of a group of them are emphasied or it could be utilisation oriented bent on improving the quality of drug therapy through instructional intervention. It follows then, that such studies can either be descriptive or analytical in nature, with the former more often adopted in explaining drug utilisation and to identifying problems requiring more detailed studies.

In addition, Shrank et al. (2007) asserts that drug utilisation research is a key component part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. Drug utilisation research and pharmacoepidemiology provide insights into aspects of drug use and drug prescribing. Pattern of use covers the extent and profiles of drug use and the trends in drug use and costs. Quality of use is determined using audits to compare actual use to national prescription guidelines. Crooks (1979) defined drug use audits as an inspection of the manner of clinical drug utilisation where indices of quality drug use include the choice (compliance with recommended guidelines), drug cost (compliance with budgetary recommendations), drug dosage (awareness of inter-individual variations in dose requirements) as well as the share of patients who are aware of or unaware of the costs and benefits of the treatment. An audit in drug use was defined by Crooks (1979) as an examination of the way in which drugs are used in clinical practice.

Drug utilisation research and pharmacoepidemiology provide information such as determinants of use which includes user characteristics such as socio-demographic parameters and attitudes towards drugs, prescriber characteristics such as speciality, education and factors influencing therapeutic decisions and drug characteristics such as therapeutic properties and affordability. Outcomes of use include the health outcomes such as the benefits and adverse effects and the economic consequences. For the purpose of further improvements and knowledge build up, the observed patterns of drug use can be compared
with the current guidelines for the treatment of a certain disease. To this, Fischer et al (2010) stated that hypotheses can then be generated to test whether the differences reveal below standard practices, whether educational programs are needed or whether there should be a revamp of the guidelines. For the purpose of benchmarking and identifying as well fostering best practices Watanabe et al (2013) suggests that drug utilisation data from different localities can be compared so that if there are any substantial differences that require further evaluation they can be detected. Therefore answers obtained from the many questions asked in drug utilisation research go a long way in instigating and adapting rational drug policy at both national and local levels.

In a study done by Tiwari et al (2004) revealed that most of the male patients were on monotherapy (60 percent). In the monotherapy category, four classes of drugs were used. These were calcium channel blockers (48.1 percent), beta-blockers (46.2 percent), ACE inhibitors (3.9 percent) and diuretics (1.9 percent). Among monotherapy drugs, calcium channel blockers were prescribed most whereas diuretics were least used. Among those who were treated with drug combinations, 92.1% received two drugs and 7.9 percent received three drugs. In combination therapy, a two-drug combination consisting of beta-blockers and calcium channel blockers was given to the majority of the patients. Overall, 57.8 percent patients were treated with a single anti-hypertensive drug and 42.2 percent were treated with anti-hypertensive drug combinations. In this study there was under-utilisation of diuretics and use of contraindicated combination like beta-blockers and calcium channel blockers.

In Nigeria in a study done by Yusuff and, Balogun (2005) diuretics were the most frequently prescribed anti-hypertensive class (39.4%), followed by centrally acting agents (23.3%), CCB (21%), ACEI (8.6%) and beta blockers (1.9%). Aspirin was the most frequently prescribed adjoining non-anti-hypertensive drugs (39.7%), followed by anxiolytics (23.6%), other non-steroidal anti-inflammatory drugs (NSAIDs) (14.8%), metformin (6.7%), glibenclamide
(5.9%), paracetamol (5.9%) and Mist Magnesium Trisilicate (3.3%). All patients made out-of-pocket payments for their prescribed anti-hypertensive drugs. BP control was adequate in only 33.9% of patients. Anti-hypertensive drugs were changed at least once in 44% of patients and BP control was significantly better in patients with at least one change. The study reported that the factors that contribute to such drug or dosage change included the severity of the condition or the doctor’s displeasure with the effectiveness of a drug. Furthermore the study found out that Diabetes mellitus and osteoarthritis were the most frequent co-morbidities at 39.6% and 22.9% respectively.

The incidence of poly-pharmacy is an aspect that can be explored in drug utilisation (Heethal et al, 2013) Drug utilisation studies from around the globe show wide variations in the use of the various classes of antihypertensive drugs and in many cases are in stark contrast to recommendations by recognized guidelines (Clement et al, 2012) Following the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) and JNC-7 report, thiazide diuretics were commended as first-line treatment in newly diagnosed unsophisticated HTN or as part of poly-pharmacy of HTN with co-morbidities. These publications indicate that thiazide diuretics are just as effective as other drug classes in uncomplicated HTN, have additional benefit in the prevention of cardiovascular events and are very cost effective (Fretheim et al, 2013).

The ALLHAT study also showed that thiazides were the most efficacious antihypertensive drug class in Blacks, while potentiating the action of other classes of antihypertensive drugs (ALLHAT, 2002). A study examining the effect of government policy in Norway for mandatory prescription of thiazides in uncomplicated HTN showed no significant change in achieving treatment targets and demonstrated potential savings (Fretheim et al, 2007). The fundamental goal of treatment should be the prevention of the important end organ damage
by HTN, such as heart attack, stroke and heart failure. Patient age, associated clinical conditions and end-organ damage also play a part in determining dosage and type of medication administered (Townsend et al., 2011).

### 2.3 Commonly Experienced Adverse effects

A side effect is an effect, whether therapeutic or adverse, that is secondary to the one intended; although the term is predominantly employed to describe adverse effects, it can also apply to beneficial, but unintended consequences of the use of a drug (Koda-kimple et al, 2009). Any medication can cause side effects, and HBP medications are no exception. Many people do not have adverse effects from taking HTN drugs, and often the adverse effects are mild (Osterberg & Blaschke, 2005). Below are the commonly experience adverse effects from each drug class according to Koda-kimple at el (2009)

#### Table 2.2.: Commonly experienced side effects

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Adverse Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>Extra urination, erection problems in some men, weakness, leg cramps, or fatigue, sudden foot pain, which is a symptom of gout.</td>
</tr>
<tr>
<td>Angiotensin Converting Enzyme (ACE) Inhibitors</td>
<td>A dry, hacking cough that doesn't go away, skin rash and a loss of taste</td>
</tr>
<tr>
<td>Angiotensin II Receptor Blockers (ARBs)</td>
<td>dizziness</td>
</tr>
<tr>
<td>Calcium Channel Blockers (CCBs)</td>
<td>constipation, dizziness, headache, palpitations, swollen ankles</td>
</tr>
<tr>
<td>Beta-Blockers</td>
<td>asthma symptoms, cold hands and feet, depression, erection problems, insomnia and sleep problems</td>
</tr>
<tr>
<td>Alpha-Blockers</td>
<td>dizziness, light-headedness, fast heart rate</td>
</tr>
<tr>
<td>Alpha-2 Receptor Agonist</td>
<td>Drowsiness or dizziness.</td>
</tr>
<tr>
<td>Alpha-Beta-Blockers:</td>
<td>dizziness, light-headedness, or weakness</td>
</tr>
<tr>
<td>Central Agonists</td>
<td>anaemia, constipation, dizziness, light-headedness, or weakness, drowsiness, dry mouth, erection problems, fever</td>
</tr>
<tr>
<td>Peripheral Adrenergic Inhibitors:</td>
<td>diarrhoea, dizziness, light-headedness, or weakness, erection problems, heartburn, stuffy nose</td>
</tr>
<tr>
<td>Renin Inhibitor</td>
<td>Cough, diarrhoea or stomach pain, heartburn, rash</td>
</tr>
</tbody>
</table>

Source: Koda-kimple at el (2009)
In a study done by Hussain et al in (2009) the dominant ADRs noted were as follows: nervous system disorders (23.15%), respiratory, thoracic and mediastinal disorders (18.94%), gastrointestinal disorders (15.78%) and general disorders and administration site disorders (13.68%). In the same study the most frequent causes of ARDs were cardiac disorders at 35.3% followed by gastrointestinal disorders (20.6%), while Alomar and Strauch (2010) found headache as most common ADR.

Due to the fact that there are no symptoms in HTN, noncompliance and non-persistence became a concern in dealing with medication adverse effects (Youssef & Moubarak, 2002). The direction of causality between noncompliance and occurrence of side effects can be argued to be bi-directional as Alomar and Strauch (2010) reported that there is an increase in noncompliance with any adverse effects registered. Also noncompliance can be thought to increase chances of side-effects. Walsh et al, (2006) showed that ARBs had the highest rate of persistence (64%) at 1 year, slightly dropping to 51 percent at 4 years. The same high levels of persistence were reported in Carter et al, (2009) study.

### 2.4 Compliance/Adherence

According to Elliot (2009) the behaviours of taking drugs can be grouped into either adherence or persistence. Compliance can be measured through monitoring attendance, clinical judgment, patient self-reports, pill counts, drug level measurement, biological effects and assessment of patient reactivity. On the other hand adherence is an appropriate use of therapy, including taking medications at the prescribed frequency, interval, and dosage. Persistence is defined as using the medications continuously over the specified period measured in terms of time. A patient can comply and adhere but exhibit non-persistence with drug treatment. From the empirical analysis, questionnaires have been shown to reliably obtain data to understand BP control (Mulazzi et al, 2009). With the advantage that such self-
reported measurement of medication taking can be a simple and inexpensive tool for detecting low adherence.

Compliance describes the extent to which patient appropriately trails medical advice for example medication or drug dose and life style modification. The issue of compliance can be affected by the actions of both the patient and the health-care provider with a positive patient-physician relationship touted to be the greatest determinant, albeit sometimes shadowed by high cost of prescription medication. On the other hand poor adherences to therapies accentuate the condition thereby considerably raising the human and economic burden of this condition. According to Ngoh (2009), Elliot (2009) and (Iskedjian, 2002) it should be appreciated that however some major barriers to compliance are beyond the control of the patient for example: involvedness of current medication procedures; low health literacy levels and lack of appreciation of benefits from treatment; adverse drug reactions; un affordable prescriptions; as well as poor communication or limited trust between the patient and his or her physician or any care-giver.

Not surprisingly, the measures to ensure compliance are targeted at streamlining packaging of medication, make reminders of medication taking, improving patient health literacy, as well as reducing the quantity of medications prescribed simultaneously. In literature there exist robust evidence for a correlation between education and physical health, as poor educational attainment come out to be a key factor in the cycle of health inequalities. Despite its importance in understanding dosage instructions, educational qualifications help to determine an individual’s access to resources through determining the position in the labour market and level of income. Shockingly, under anti-hypertensive therapy, about 50% only are reported to be taking at least 80% of their prescribed medications (Fischer, et al 2010). This is despite decades of attention to addressing noncompliance to treatment for HTN. Of let, approaches to enhancing compliance has adopted the use of patient demographics, medication
characteristics, clinical factors, health beliefs, and the quality of patient-provider communication (Kayima et al, 2013).

Noncompliance can mean just failing to take medication at the appropriate time, something that is material in the management of HTN (Ngoh, 2009). As noted earlier, such noncompliance decreases the effectiveness of medications and increases side effects leading to hospitalisations and thus increasing the total costs of the disease (Kayima et al, 2013). Fischer, (2010) reported that, 69% of patients with adverse effects were noncompliant. Unlike the efficacy of medicines demographics are not particularly good predictors of noncompliance as empirical works have shown that noncompliance is not restricted to one or more demographic group(s) (Elliot, 2009).

However duration of the treatment and type of drug can influence compliance and persistence, with short treatment duration and calcium antagonist or an ACEI producing favourable results (Watanabe, 2013). On the other hand Ngoh (2009) reported that despite that only 11% of patients who were not persistent stopped taking their medication because of side effects, surprisingly 46% stopped because they thought they had been cured, 25% stopped because they thought their doctor told them to stop, and 6% stopped because of financial considerations. Such observations points to limited education on the nature of the condition and its management, (Svensson et al, 2000).

The health belief model states that the main factors in compliance are the patients’ perceived susceptibility to the illness or condition, its perceived severity, and the perceived benefits and barriers to compliance. Some studies found that perceived barriers were the most powerful predictors of compliance they include cost, disruption of daily schedule, whether the medication was hard to obtain, and potential health problems from the medication, side effects, taste of the medication, and dissatisfaction with the doctor-patient relationship (Kayima et al, 2013). The cost barrier accounted for 50% of the noncompliance in one study.
and was most important for younger patients and those in early stages of treatment (Fischer, 2010). The management of HTN is still far from optimal, although safe and effective drugs are available and the effectiveness of antihypertensive therapy in reducing cardiovascular morbidity is well established (Watanabe, 2013). Low patient compliance is one of the most important therapy-limiting factors in HTN. To date, the majority of studies in this field have been focused from the medical care perspective, but few studies have focused on the patients' point of view (Gascón, et al, 2004) Patients had fears and negative images of antihypertensive drugs. The data also revealed a lack of basic background knowledge about HTN (Gascón, et al, 2004).

Studies spanning several decades have identified myriad factors related to poor BP control. These factors can be divided, somewhat arbitrarily, into patient-related factors and physician-related factors. Patient-related factors include access to health care, compliance, and co-morbidities. Physician-related factors include knowledge base; perceptions about the care delivered, and practice patterns. Several older studies suggest an association between compliance and BP control (Shulman et al, 1982). Reasons for poor compliance may include insufficient patient knowledge, inaccurate perceptions, medication cost, and side effects of therapy (Alexander, 2003).

In some instances management of HTN is being made difficult by ignorance. For example in America, in a national telephone survey, 68% of respondents indicated that HTN was not a serious health concern, and nearly half did not know BP normal readings (Alexander, 2003). Seeing HTN as not a serious health issue may lead to noncompliance and studied factors lead to compliance among others include faith in the physician, fear of the complications of HTN and desire to control BP (Ross et al, 2004). However Dunbar & Mortimer, (2001) asserts that cases of patients not taking medicines to minimise side effects are realistic, as for patients who have no symptoms of HTN, the fact that they feel well may encourage noncompliance.
From the theoretical perspectives, a number of psychological theories applied in the examination of health beliefs with regards to compliance. According to Becker (1974), the health belief model suggests that patients need to evaluate the benefit of health related behaviour by weighing the costs associated with the consequences, for example illness and its severity, of bad behaviour. On the other hand Azjen (1985) proposes a theory of planned behaviour which describes action as secondary to intention. Further noting that intention is resulting from attitude, perceived control over the behaviour and the views of others, subjective norm.

In addition self-regulatory model posits a strong link between ideas on certain illness themes representations and health related behaviour. About five themes have been identified in literature which are: identity, time-line, cause, consequences and cure/control of the illness and patients’ beliefs about these determine whether or not they are going to comply with the therapy. Wang et al (2002) noted that sometimes patients assess the efficacy of therapy and decide whether to continue or not. To further understand the driving forces of noncompliance, the authors examined whether there is an association between the beliefs about medicines questionnaire and a measure of adherence. The result was a statistically significant relationship between high specific-necessity scores and good compliance and high specific-concern scores and poor compliance.

**Table 2.3: Factors that reduce compliance to antihypertensive therapy**

<table>
<thead>
<tr>
<th>Patient and disease characteristics</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic condition</td>
<td>Condition suppressed, not cured</td>
</tr>
<tr>
<td>No immediate consequences of stopping therapy</td>
<td>Social isolation</td>
</tr>
<tr>
<td>Disrupted home situation</td>
<td>Psychiatric illness</td>
</tr>
<tr>
<td>Treatment characteristics</td>
<td>Long duration of therapy</td>
</tr>
<tr>
<td>Complicated regimens</td>
<td>Side effects of medications</td>
</tr>
<tr>
<td>Expensive medications</td>
<td>Multiple behavioural modifications</td>
</tr>
<tr>
<td>Lack of specific appointment times</td>
<td>Long waiting time in office</td>
</tr>
</tbody>
</table>

Source: (UP to Date, 2014)
According to Hyman and Pavlik (2001) majority of patients prescribed antihypertensive medication stopped treatment within 12 months citing various reasons from side effects, health beliefs as well as cost of medications. However it should be noted that such noncompliance explains much of the problem of uncontrolled BP. The issue for noncompliance due to high costs of medicines is more worrying in developing economies where patients have to choose among competing priorities on the meagre earnings (Whitworth, 2003). Isezuo and Opara (2000) and Akpa et al (2005) add other factors that range from ignorance, poverty, employment status, level of education, distance to treatment centres, transport costs, cultural beliefs among others as significant in explaining noncompliance. The same sentiments were echoed by results from a focus group discussion (Osamr and Owumi, 2011). Adding that participants share that their belief is that since having HBP did not make one feel sick, what may be the rationale for daily treatment without an end in sight?

On the flip side, there are patients who comply very well with treatment and reasons cited for such include fear of the side effects and complications and a general willingness to fight the condition (Benson & Britten, 2002). In essence it is about a positive attitude; accept the chronic condition and willing to manage it. However, in general lifestyle guidance is abandoned in the long-run unless the patient is uniquely motivated to fight the condition (Fung et al, 2007). Others comply as they just feel better on drugs contradicting the general belief among physicians that HTN is a largely asymptomatic disease (Dosse et al, 2009). Chapman et al (2005) categorised the factors contributing to lack of compliance into five: patient-related, condition-related, therapy-related, health system and socioeconomic factors. From the therapy category, Cramer et al (1989) reports that compliance is strongly affected by the number of times a treatment must be taken each day, with lower frequencies often preferred (see also Iskedjian, 2002; Wetzels et al, 2004; Taylor & Shoheiber, 2003;
Choudhry et al, 2011; Bautista, 2008; Burnier, 2006). Concurrent therapy is also reported to adversely influence adherence (Degli et al, 2002) with results differing depending at which time of the day (more compliance for daytime concurrent treatment versus evening time) the treatments are taken (Würzner et al 2001). Chapman et al (2005) reported that among patients receiving both HTN and lipid-lowering therapy, only one third was compliant with both therapies at six months.

**Table 2.4: General guidelines to improve patient adherence to antihypertensive therapy**

<table>
<thead>
<tr>
<th>Be aware of the problem and be alert to signs of patient non-adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish the goal of therapy: to reduce blood pressure to near normotensive levels with minimal or no side effects</td>
</tr>
<tr>
<td>Educate the patient about the disease and its treatment</td>
</tr>
<tr>
<td>Involve the patient in decision making</td>
</tr>
<tr>
<td>Encourage family support</td>
</tr>
<tr>
<td>Maintain contact with the patient</td>
</tr>
<tr>
<td>Encourage visits and calls to allied health personnel</td>
</tr>
<tr>
<td>Allow pharmacist to monitor therapy</td>
</tr>
<tr>
<td>Give feedback to the patient via home BP readings</td>
</tr>
<tr>
<td>Ask about adherence</td>
</tr>
<tr>
<td>Make contact with patients who do not return</td>
</tr>
<tr>
<td>Keep care inexpensive and simple</td>
</tr>
<tr>
<td>Do the least workup needed to rule out secondary causes</td>
</tr>
<tr>
<td>Obtain follow-up laboratory data only yearly unless indicated more often</td>
</tr>
<tr>
<td>Use home blood pressure readings</td>
</tr>
<tr>
<td>Use nondrug, no-cost therapies</td>
</tr>
<tr>
<td>Use the fewest daily doses of drugs needed</td>
</tr>
<tr>
<td>Tailor medication to daily routines</td>
</tr>
<tr>
<td>Use generic drugs</td>
</tr>
<tr>
<td>Ask patient to provide list of preferred drugs from insurance</td>
</tr>
<tr>
<td>Have pharmacist suggest low-cost alternatives</td>
</tr>
<tr>
<td>If appropriate, use combination tablets (eg, ACE or ARB with CCB and/or low-dose HCTZ)</td>
</tr>
<tr>
<td>Use pill box(es), blister packaging, or electronic reminders (eg, Smartphone app)</td>
</tr>
<tr>
<td>Prescribe according to pharmacological principles</td>
</tr>
<tr>
<td>Add one drug at a time</td>
</tr>
<tr>
<td>Use longer-acting drugs with less peak-trough BP lowering variation</td>
</tr>
<tr>
<td>Use moderately dosed combinations to minimize side effects (eg, ACE or ARB with low-dose diuretic and/or amloTdipine)</td>
</tr>
<tr>
<td>Start with small doses, aiming for 5 to 10 mmHg reductions at each step</td>
</tr>
<tr>
<td>Have medication taken immediately upon awakening in the morning</td>
</tr>
<tr>
<td>Prevent volume overload with adequate diuretic and sodium restriction</td>
</tr>
<tr>
<td>Titrate gradually, particularly beta blockers</td>
</tr>
<tr>
<td>Be willing to stop unsuccessful therapy and try a different approach</td>
</tr>
<tr>
<td>Anticipate side effects</td>
</tr>
<tr>
<td>Adjust therapy to ameliorate side effects that do not spontaneously disappear</td>
</tr>
<tr>
<td>Continue to add effective and tolerated drugs, stepwise, in sufficient doses to achieve the goal of therapy</td>
</tr>
</tbody>
</table>

Source: (UPtoDate, 2014)
2.5 Lifestyle modification

Pharmaceutical care also implies that health education and prevention is carried out in the pharmacy and encourages non-pharmacologic measures for BP control. Results from long-term follow up studies shows that many patients fail to sustain lifestyle changes (Elliott and Marriott, 2009). Lifestyle modification must be encouraged because are safe, inexpensive and when combined with drug therapy result in better BP control and improved quality of life (Tilson, 2004).

2.5.1 Dietary Approaches to Stop Hypertension

Lifestyle modification is recommended for all individuals with HTN (JNC8, 2014) as depending on drug treatment only is insufficient (Appel, 2003). JNC7 (2004) recommends adoption DASH (Dietary Approaches to Stop HTN) a type of dietary to consume a diet that is rich in fruits and vegetables (8–10 servings/day), rich in low-fat dairy products (2–3 servings/day), and take food that has reduced amounts of saturated fat and cholesterol. JNC7 (2004) advocates for reduced sodium intake that is reduce daily dietary sodium intake as much as possible; ideally to no more than 65 mmol/day equal to 1.5 g/day sodium, or 3.8 g/day sodium chloride. JNC7 (2004) also recommends increased dietary potassium intake to 120 mmol/day (4.7 g/day), which is also the amount provided in a DASH-type diet. It has been found out that the dietary intervention is a practicable, safe and effective measure, even in the elderly (Whelton et al, 1998; D’Elia et al, 2011). Eating a diet that is rich in whole grains, fruits, vegetables and low-fat dairy products and skims on saturated fat and cholesterol can lower BP by up to 14 mm Hg (D’Elia et al, 2011).

There are some products that also when taken in some certain quantities reduce BP, although not without side effects that impede its regular prescription. An example is fish oil, which is
rich in omega-3 polyunsaturated fatty acids (omega-3 PUFA,) can reduce BP. Appel et al (1993) reports the success of omega-3 PUFA based on two meta-analyses, where 3g or more of fish oil per day was optimal. However greater effect was observed in H BP subjects than their counterparts. On the other hand monounsaturated fatty acids on HTN have received limited attention; with one trial showing that, a diet rich in monounsaturated fatty acids can lower systolic and diastolic BP by 8 and 6 mmHg, respectively (Ferrara et al, 2000). In view of these results, as well as the enormous interest in Mediterranean style diets that are associated with reduced risk of cardiovascular disease, additional research on the BP effects of monounsaturated fatty acids is warranted. The current challenge to health care providers, researchers, and public officials is to develop and implement effective clinical and public health strategies that achieve and maintain healthy lifestyle modification.

There is strong evidence that salt restriction can reduce systolic BP by approximately 4–5 mmHg in hypertensive individuals and 2 mmHg in normotensive individuals. Responses vary between individuals—generally greatest among the elderly and those with severe HTN. Increasing dietary potassium can reduce systolic BP by 4–8 mmHg in hypertensive individuals and 2 mmHg in normotensive individuals. The most common recommendation is to limit sodium to 2,300 milligrams (mg) a day or less. A lower sodium level 1,500 mg a day or less is appropriate for people 51 years of age or older, and individuals of any age who are black or who have high BP, diabetes or chronic kidney disease. Strategies to reduce sodium intake include, track how much salt is in your diet, read food labels, eat fewer processed foods and do not add salt.

Geleijnse et al, (2003) found out that potassium intake help reduce BP more in hypertensives than normotensives. However in a related past study, the effect was found to be more significant in subjects who had higher intake of salt which can be explained the inhibitory effect of potassium on salt sensitivity (Whelton et al,1997). Furthermore, there are a number
of studies that found out a link between increased dietary potassium intake and reduced stroke rate (Bazzano et al, 2001). Potassium can lessen the effects of sodium on BP. The best source of potassium is food, such as fruits and vegetables.

2.5.2 Regular physical activity

Physical activity is also recommended and from literature a meta-analysis of 27 randomized trials reports a 4 mmHg net reduction in systolic BP among individuals aligned to an aerobic exercise treatment (Whelton et al, 2002). The magnitude of BP change appeared to be independent of the exercise intensity. In addition to a direct beneficial effect on BP, increased physical activity should also lower BP by facilitating initial weight loss and by promoting maintenance of weight loss, once achieved. In aggregate, these findings support the recommendation of the US Surgeon General that persons exercise 30 min or more most, if not all, days of the week compared with the control diet with higher sodium, the DASH diet with lower sodium reduced systolic BP by 7.1 mmHg in non-hypertensive persons, and 11.5 mmHg in hypertensives (Appel, 2003). Regular physical activity at least 30 minutes most days of the week can lower your BP by 4 to 9 mm Hg.

There is strong evidence that regular physical activity has an independent cardio protective effect. A meta-analysis of randomized controlled trials found that aerobic exercise reduced BP by roughly 5/3 mmHg (Lenz and Monaghan, 2008). Regular exercise may be beneficial for both prevention and treatment of HTN. In fact, moderate or low intensity exercise such as walking, swimming, cycling in hypertensive subjects may have an even greater BP lowering effect than higher intensity training (Ogihara & Rakugi, 2005). People with any of the following should defer physical activity until medical review: grade 3 HTN (systolic BP ≥ 180 or diastolic BP ≥ 110), angina, uncontrolled heart failure, aortic stenosis, resting tachycardia or arrhythmias symptoms for example chest discomfort, shortness of breath and low activity diabetes with poor glycaemic control and other acute illness. Advise against
isometric exercise routines that may raise BP for example weight lifting, except within professionally supervised programs.

2.5.3 Alcohol intake

As much as lifestyle from the point of diet and physical exercise help control BP, there are some lifestyles that are prevalent in communities that do much harm to the whole HTN management process. For example, Campbell et al (1999) reports that alcohol abuse increases BP while Appel et al (2003) note that reduction in alcohol consumption lower BP in some patients. In a related study, D’Elia et al (2011) asserts that an abrupt termination of alcohol intake in individuals consuming great amounts of alcohol , however, resulted in a rapid increase in their BP (D’Elia et al, 2011). This explains why binges drinking increase the risk of HTN; cessation must be staged than big-bang. The relationship between high alcohol intake (typically three or more drinks per day) and elevated BP has been documented in many epidemiologic studies. Available evidence supports a recommendation to limit alcohol intake to no more than two drinks per day (men) and one drink per day (women) among those who drink (Appel, 2003) as 16% of all hypertensive disease is attributed to alcohol (Beilin &, Puddey, 2006).

2.5.4 Effects of smoking on blood pressure

Smoking has an effect on systolic or DBP values which can either be long and short-term. It is still not clear on what are the long term effects of smoking on BP, however, the synergic impact of smoking and HTN on cardiovascular risk is well documented (Ellekjaer, et at, 2001). On top of all the other dangers of smoking, the nicotine in tobacco products can raise BP by 10 mm Hg or more for up to an hour after smoking. Smoking throughout the day means BP may remain constantly high. According to Lenz and Monaghan, (2008) smoking cessation may not directly reduce BP, but markedly reduces overall cardiovascular risk.
2.5.5 Body mass index (BMI)

Besides behaviours, body mass index (BMI) has an effect on HTN. An individual with BMI of between 25 and 30 is considered overweight and above 30 is obese, a condition linked with treatment failure (Redon, 2001). Furthermore, the condition makes it difficult to evaluate HTN treatment outcomes as together with BP, the two are cardiovascular disease risk factors (Redon, 2005; Sundquist, 2001). BP often increases as weight increases. Losing weight also makes any BP medications more effective. Men are at risk if their waist measurement is greater than 40 inches (102 cm). Women are at risk if their waist measurement is greater than 35 inches (89 cm), weight loss of 10 kg can reduce systolic BP by 6–10 mmHg, (Heart Foundation Guide to management of HTN 2008). Average weight of BP patients is often more than that of the persons with normal BP values. Although loss of weight results in decreases in BP, it also leads to sodium-sensitivity reduction of the hypertensive subjects.

A weight loss of 10 Kg in obese BP subjects translating to BP reductions of 5-20 mmHg (Zamboni et al, 2005). A consistent body of evidence from observational studies and clinical trials indicates that weight is positively associated with HBP. The importance of this relationship is reinforced by the high and increasing prevalence of overweight and obesity throughout the world. Virtually every clinical trial that has examined the influence of weight loss on BP has documented that weight reduction lowers BP (National Heart, Lung, and Blood Institute, 1998). In one study that aggregated results across 11 weight loss trials, average systolic and diastolic BP reductions were 1.6/1.1 mmHg per kilogram of weight loss (Staessen et al,1989).

2.5.6 Summary of effects of life style modification

Regular physical activity that is regular moderate-intensity aerobic physical activity; at least 30 min of continuous or intermittent 5 days/wk. Weight management also complement HTN
pharmacotherapy such as lose weight; attaining a BMI <25 kg/m² as well as reduction in alcohol intake and avoiding tobacco products. From literature numerous evidence exists that points to the positive effects of major diet intervention for example calcium-replete diets high in fruits and vegetables as well as low in sodium are reported to have the ability to lower BP to a similar magnitude to single-drug antihypertensive drug therapy (Sacks et al, 2001).

The effects of each activity are shown on Figure 2.1 Factors specific to lifestyle adherence include the patient’s readiness to make changes, the burdens of lifestyle changes, patient beliefs about lifestyle changes, and the availability of social support for lifestyle changes (Up to Date, 2014).

![Figure 2.1: Expected Decline in BP by Non-Pharmacological Intervention in HTN](image)

Source :( Fresoli et al, 2011)

**Figure 2.1: Expected Decline in BP by Non-Pharmacological Intervention in HTN**

**2.6 Knowledge, Attitudes and Practices in Hypertension**

Even though assessment knowledge, attitudes, and practices (KAP) is considered key component in the management of HBP, scant information exist from developing countries, (Aubert et al., 1998). The socio-economic changes faced by developing countries that include among other things inactive habits like alcohol consumption as well as urbanisation and
aging population explains the rise of HTN and other CVDs as a public health problem in these economies, (Akinkugbe, 1987). An appropriate assessment and understanding of KAP factors is needed for chronic conditions such as HBP, as preclusion and regulation calls for a lifelong change of healthy lifestyles.

However such lifestyles prevalent at any point in time are moulded by shared attitudes, beliefs, behaviours, and social conditions and tend to be stable over time. Silagy et al (1993) bemoaned indulgence short term pleasurable behaviours such as relishing fatty and salty food, evading physical exercise, and smoking as powerful deterrents to proper management of HTN. In some instances it may be that individuals may perceive that they lack the skills to adopt healthy lifestyles or that they cannot afford them (Aubert et al., 1998).

Knowledge and attitudes of patients have impact on the management of their illnesses, and improving knowledge is known to improve compliance with treatment in conditions such as HTN (Shaikh et al, 2012). Studies show that many patients did not have appropriate knowledge about HTN (Susan et al, 2005). Considering the high morbidity and mortality due to HTN, and knowing that if a patient has knowledge about the disease, patient will be more careful about the management, and a better control can be achieved.

More often hypertensive patients believe that the condition is serious while the medication has numerous adverse drug reactions. As such they believe that it is fit and proper to take the hypertensive medication only when they feel the BP is high, that is, following BP monitoring, or symptoms such as headache, chest pain, dizziness, they believe that it is untreatable and these believes indicate their inappropriate action about disease management. (Sabouhi et al., 2011). Victor et al’s study (2008) also indicated that patients believed that HTN has signs and symptoms and it is not asymptomatic and silent killer (Chalmers & Zanchetti, 1996). It has been shown that patients who are more aware of the condition show
positive attitude than those with limited knowledge, however but both group had the same action (Aubert et al, 2006).

Khosravi et al (2006) beamoanes lack of medication regimen protocol for most hypertensive patients concluding that it makes the regimen ineffective, increasing the probability of side effects and non-compliance. It is therefore imperative to target physicians and related health care providers in health educational programmes to improve on protocol. The levels of education also have an influence on the knowledge on the risk factors of HTN. In Tanzania 70% of those who had no formal education did not know the risk factors of HTN as compared to 6.7% among those who had higher education, 11.6% who had secondary education and 18.9% among those who had primary education (Frijling et al,2004). All the patients in the UK had at least primary education and all could at least mention one risk factor of HTN. This underlines the importance of primary education in the primary health care (Frijling et al, 2004).

A challenge with KAP assessment from population surveys is that of social desirability, whereby respondents are unwilling to acknowledge socially ill KAP to avoid giving a negative impression (Nothwehr et al, 1994). The data show that more than half of the health workers in all the facilities teach patients to know their BP readings, to know the names of drugs they are taking, the strength and frequency of taking treatment as well as about the consequences of uncontrolled BP (Townsend et al., 2011). Evidence suggests that reduction of the BP by 5 mmHg can decrease the risk of stroke by 34%, of ischaemic heart disease by 21%, and reduce the likelihood of dementia, heart failure, and mortality from cardiovascular disease(Townsend et al., 2011).

Although lifestyle modifications are frequently neglected, they should be started early and continued indefinitely (Nageshwar Gullapalli, 2010). Patients with HTN were poorly
compliant with exercise and dietary regimens, Sex, educational level, work status, smoking habits and self-reported response to medications affected compliance, as did patients’ perceptions of HTN (Mahmoud, 2012).

Holistic medicine is defined as an approach to medical care that emphasizes the study of all aspects of a person's health, including physical, psychological, social and cultural factors as well as economic influences on health status (Hirsch et al, 2002). It is a system of health care based on a concept of the whole person as one whose body, mind, spirit, and emotions are in balance with the environment (Hirsch et al, 2002). With holistic health, people accept responsibility for their own level of well-being and everyday choices are used to take charge of one’s own health (Akl et al, 2006). Holistic medicine stresses the patient's role in health care through such means as positive attitudes, sound diet, and regular exercise, knowledge about causes, symptoms, risk factors, complications, management, prevention and control of HTN. (Akl et al, 2006). Health professionals must develop knowledge and skills appropriate to manage the medical, physical, social and emotional problems in patients of all ages (American Academy of Family Physicians; 2003).

2.7 Medicines Accessibility
Pharmacoeconomics focuses on the costs and benefits of drug therapy. Pharmacoeconomics evaluations provide a basis for resource allocation and utilisation (Ahuja et al, 2004). Several studies have found that low drug availability limits access to medicines in low and middle-income countries. Cameron et al (2009) investigated the availability of 15 generic medicines used for a range of conditions in 36 developing countries and found it to be 38% and 64% in the public and private sectors, respectively. Studies focused on medicines used to treat chronic conditions have shown similar results (Babar, Ibrahim, Singh, Bukahri, & Creese, 2009). Although prevention of HTN through healthy lifestyles and risk factor control is well
advised and successes are well recorded pharmacotherapy of manifest disease will, however, remain necessary.

As chronically ill patients require ongoing support and management this remains a challenge even in developed economies boasting of vast resources since the nature of the health systems has developed through direct patient-provided care which is suitable for acute diseases (Goroff & Reich, 2010). Thus many persistently ill patients remain under-treated, even in well-resourced health care systems. For example only 50.6 per cent of respondents with a chronic condition in high-income countries reported having access to treatment; the percentages in low-income and lower-middle-income countries were even lower: 32 per cent and 37.5 per cent, respectively (Wagner, et al 2011).

Obstacles to CNCDS medicine access at the care-provision level can arise in several areas, such as development, availability, distribution, care provision and usage. The degree to which those obstacles impede access to CNCDs medicines can vary substantially by geographic location and socioeconomic status within a given country (Miranda, et al 2008). Appropriate use of essential medicines and technologies can significantly reduce morbidity and mortality from HTN (Lim, 2007). However, in many low and middle-income countries, access is limited and prices are high (Wagner, et al 2011). Adherence to drug treatment is an important component of managing chronic diseases. One of the reasons of non-adherence is the unavailability of the medicines
Cost of prescription is important in chronic disease like HTN. One of the better approaches to decrease the prescription cost is to prescribe cheaper brands. Since HTN is a long term disease and drug has to be continued for a lifetime, there is a reasonable scope in reducing the prescription cost by prescribing cheaper alternatives (Slonki et al, 2013). Controlling HTN requires adequate access to treatment with antihypertensive medication as well as compliance with such treatment, failure of which renders a deplorable burden on patients and their families. Over and above the personal cost, to the individual patient, there is a massive avoidable economic burden on the rest of the economy (UP to Date, 2014). Multiple drugs are required for management of HTN but poly-pharmacy is associated with a high cost, increased risk of side effects, drug interaction and noncompliance (Good, 2002).

The minimum effective doses should be prescribed, generic brands should be used, and options available at low out-of-pocket cost should be emphasized for all patients, including those with a prescription plan (Slonki et al, 2013). An increasing number of once-a-day formulations are available so that fewer tablets are needed. The use of less expensive
medications is being emphasized in an attempt to reduce the costs of health care and to ensure that patients have access to needed medications without undue cost barriers. Although there are often low-cost options available, the cost of therapy remains significant impediment to the management of HTN (Shulman et al, 1991).}

Simplistic comparisons of costs based purely on the costs per tablet may be misleading. As an example, in a survey of hypertensive patients in South Carolina, the experiences of 947 who were given three 60-mg doses of short-acting generic diltiazem per day were compared to the experiences of 301 given one 180-mg dose of the more expensive brand of long-acting diltiazem per day (Sclar et al,1994). Those on the once a day dose required fewer concomitant antihypertensive drugs, adhered more closely to therapy, and required less use of and expenditures for physician and hospital services. Although their drug costs were higher, their total costs of health care were less.

Despite the significant amount spent on medicines, one potentially important reason why overall direct expenditures are high is patient non-adherence and non-persistence with medications. Among Medical insurance patients, HTN medications are among the most frequently used and highest-payment drug categories (Kaiser Family Foundation, 2004). It follows that countries faced with limited budgets would seek to reduce Medicaid spending on HTN medicine. However, policies with the potential to disrupt medical treatment in vulnerable populations should be carefully examined for their effect on long-term costs and patient health. In another study of Medicaid patients with HTN, patients with documented non-adherence to antihypertensive therapy had total medical costs that were $873 higher per patient than those of hypertensive patients without documented non-adherence. The higher costs were primarily due to higher inpatient hospital expenditures (averaging $637 per
Another study found that 11% of hospital admissions among the elderly were due to non-adherence (Col et al, 1990).

On the other hand mere market authorization does not guarantee patient access to any given drug, (Blankart et al, 2011). There is need to ensure patient access to essential medicines (in adequate amounts, appropriate dosage forms and quality among other key essentials), the ones that satisfy the priority health care needs of the population (Blankart et al, 2011). The medicines should be identified and informed by the prevalence of the disease, record of its efficacy and safety and how relatively cost effective it is. Pharmaceuticals economic impact is remarkable more so in developing countries, despite spending on pharmaceuticals in developed countries representing less than one-fifth of total public and private health spending, in transitional economies it is up to 15-30% and 25 to 66% in developing countries ((Slonki et al, 2013).

Use of drugs from the essential drug list should be promoted for optimal use of limited financial resources, to have acceptable safety and to satisfy the health needs of the majority of the population (Slonki et al, 2013). Affordability is a great hindrance since currently numerous drugs are available for regulation of HBP and its consequences (Ekwunife et al., 2013). When prescribing medication the issue of cost, thus affordability, should be borne in mind. Nordmann (2001) found out that ACE-inhibitors were expensive relative to the gain derived from them and therefore concluded that they should not be recommended as antihypertensive first-line therapy.

Consideration for cost of treating high BP patients goes beyond the costs of drugs only as it should encompass all the costs associated with the treatment which may among others things include laboratory tests, visits, side effects management. Such consideration will reveal that two-drug monotherapy, often is the most expensive way of treating HTN. When using two
agents, the cost of office visits for titration, two dispensing fees, two co-payments, and the cost of two drugs frequently exceed the cost of any other form of treatment. High-dose monotherapy in some instances requires two of a particular drug, which doubles the cost of medication, (Blankart et al., 2011).

Encouraging the prescription of low cost and affordable drugs is recommended. Physician education programs should explain the lifetime cost of antihypertensive medications. Fixed-dose combinations may cost less than two separate prescriptions. In the absence of major differences in efficacy, safety and convenience, comparative cost may become the final discriminator, small differences in cost in treating a condition which affects 35% of the population can add up to substantial sums, particularly as treatment is usually lifelong (Salvetti and Ghiadoni, 2006).

Management of HTN is not easy because of treatment costs, a common cause of interruption of therapy (Ibrahim, 2013). Because of its high prevalence, the treatment of HTN puts economic pressure on the economy. Drug cost is the major determinant of the cost of care, responsible for around 80% of the total cost of HTN care within the first year of treatment (Ibrahim, 2013). Guidelines should give priority to the cost of care. Furthermore, more than 58% of spending on health care is out of pocket (Ibrahim, 2013). Choices must be made as to how the limited budget is spent. On the other hand, drugs of first choice should be the least expensive such as thiazide.

Patients will not adhere to drugs that they cannot afford. Absence of functional primary health care services means that even free or inexpensive drugs cannot be reliably provided to those in need. Financial incentives from industry for health care providers to selectively prescribe more expensive drugs despite bringing no clear advantage over cheaper drugs, such
as diuretics (Johnston et al., 2010). Priority of the health care system is given to acute conditions resulting in inaccessibility of chronic medicines.

2.8 Conceptual Framework

This study is based on pharmacotherapy concepts which include drug utilisation, pharmacoepidemiology, pharmacoeconomics and pharmaceutical care.

![Conceptual framework for pharmacotherapy](image)

*Figure 2.3. Conceptual framework for pharmacotherapy*
CHAPTER THREE

METHODOLOGY

3.0. Introduction

This chapter outlines the research design and methodology followed to meet the objectives of the study. The research methodology was identified after clearly outlining the research design. The validity or lack of, thereof, of the analysis of the study rested upon proper setting of the research design and selecting the most suitable methodology to apply. A discussion on steps followed in ensuring and assessing validity and reliability of the instrument is provided. Therefore, this chapter is central to the authenticity of the study results and recommendations. The chapter is organised into the following key sub-headings: Research Design; and Research Strategy; Population and Sampling Techniques; Data collection Methods; Research Procedure; Data Analysis Techniques; Ethical Considerations; and chapter summary.

3.1. Research Design

Given the problem at hand, establishing the status of chronic pharmacotherapy in people living with HTN in Zimbabwe, an exploratory study was plausible. This research utilised snapshot a time horizon which is called cross-sectional; this is a study of a specific phenomenon at a particular time. This is a suitable time horizon which goes with the amount of time and financial resources that were available. Quantitative research is interested in using formalised, customary organised questioning, whereby reaction options are pre-determined. On the other hand, in light of scientific research principles, deduction approach stipulates independence of the research from the observations. This was achieved in this research through the use of a structured questionnaire.

In this research, concepts were designed to allow quantitative measurement. Deductive approach was chosen for this study because it is a lower risk approach though there can be risks such as unable to rich the required
sample size which was overcome by engagement of research assistance. On the other hand, it is quicker to complete and less costly.

3.2. Research strategy

In this research a survey strategy was used because no research strategy is inherently superior or inferior to any other but the fact that it should be able to answer the research questions and meet the research objectives. When selecting the approach, consideration was put on prior knowledge, time and resource constraints.

3.3. Population and sampling techniques

The study targeted patients who were using conventional medicines to control their HTN and were 18 years and above. This study was carried out on chronic pharmacotherapy users who have HTN, who visited the 20 systematically randomly selected private pharmacies in Harare, Parirenyatwa hospital pharmacy outpatient and Harare hospital outpatient pharmacy. The sample constituted 400 patients with HTN, 200 from private pharmacies, 100 from Harare Central hospital and 100 from Parirenyatwa group of hospitals. Systematic random sampling was used using a register from Medicines Control Authority of Zimbabwe (MCAZ) to choose participating private pharmacies. The formula below was used to calculate the sample size with the assumption that the variables being evaluated are at 50%.

\[
\text{Sample size} = \frac{Z^2 \times (p) \times (1-p)}{c^2} \quad \ldots \quad (1)
\]

Where:

\[Z = Z \text{ value (e.g. 1.96 for 95\% confidence level)}\]

\[p = \text{percentage picking a choice, expressed as decimal (50\%)}\]

\[c = \text{confidence interval, expressed as decimal (e.g. .05 = ±5)}\]

\[
\text{Sample} = 1.96^2 \times (0.5)(0.5)/.05^2 = 384.16
\]
Persons of at least 18 years of age were identified as hypertensive based on current self-reported treatment for HTN with a prescription medication.

3.4 Inclusion criteria

All patients 18 years and above who had HTN and were using convectional medicines to control it who consent to participate in the study were included in the study. People who had used anti-hypertensive for at least one year were included.

3.5 Exclusion criteria

Individuals who have been diagnosed of HTN but were not using conventional medicines to control it were not included. People with pregnancy induced HTN were also not included.

3.6 Data collection methods

In order to gather data for analysis primary data collection approaches were followed. The study was predominantly quantitative because the available time could not permit the researcher to include comprehensive qualitative methods such as focus group discussion.

3.7 Research procedure

Literature and extensive discussions with physicians of hypertensive patients and the patients themselves informed the design of the survey instrument used in this study. Thus tools to evaluate patient characteristics were adapted from validated existing instruments. As is common with any research instrument, the questionnaire was exposed to pilot testing on a sample 20 patients who did not however form part of the final study but had the characteristics of the actual respondents. The questionnaire was pilot tested and standardized using trained interviewers for the purpose of understanding feasibility and usability of the instrument. This also ensured that the trained assistance will produce consistence results in terms of administering the questionnaire.
Furthermore, to ensure meaningful inferences from the analysis, validity and reliability of questionnaire were checked using content validity and test re-test respectively. With a difference of less than 10% and r=0.73 the reliability of the data collecting tool was approved. Subjects attending test re-test were left out of the study.

An interviewer administered structured questionnaire on chronic pharmacotherapy users. Their BP was measured after five minutes of rest on a respondent in a sitting position; the average of two readings was recorded. The questionnaire included demographic information, the Beliefs about Medicines Questions (BMQ), the Illness Perception Questions (IPQ-R), (Moss, 2002). The IPQ-R questions were used to assess knowledge about HTN and perception of risk. Compliance on the other hand was captured from questions based on Morisky's self-report questionnaire (Morisky et al, 1986). The questions included relate to medication taking, checking forgetfulness, carelessness and discontinuing medication as a result of improvement or worsening in symptoms. This method was used successfully by Patel (Patel & Taylor, 2002). The BMQ was included because elicits beliefs about some specific medicines or just medicines in general, (Horne et al, 1999).

Although there are multiple ways to assess patients' adherence, none has been found to be particularly accurate. More sophisticated techniques, such as electronic medication monitors, are not currently available for clinical practice (Osterberg & Blaschke (2005) and may not be feasible in Zimbabwean settings because of the economic challenges. A brief questionnaire regarding adherence may be a reasonable alternative. An example is found in Fodor et al (2005) where subjects claiming adherence had better management of their BP. Although others have disputed the use of self-reported compliance data base on its accuracy a number of studies support inclusion of such questions. Choo (1999) suggested that self-reports should be part of studies, while DiMatteo et al, (2002) compared various methods and found it reliable and competitive over and above being inexpensive and easy to manage. There is an added positive externality on the psychological aspect of the patients when they have a chance to think and reflect on their own medicine taking habits while answering the questions.
On the other hand, KAP questions were included although they pose a challenge on social desirability as participants may not be willing to admit socially unacceptable KAP. To address that, KAP questions relating to specific sensitive topics like alcohol intake habits, overweight were strategically positioned in the questionnaire so that the questions flow as ordinarily as possible. This has an advantage of improving self-reporting of the true KAP.

3.8. Questionnaire and interview schedule details

Structured questionnaires were used due to their advantage of allowing all necessary questions to be asked in a logical order and ensuring that all the relevant information is obtained. Also since this study is predominantly quantitative, structured questions are the best to extract relevant data from participants. In selecting the questions to include in the instruments, each question’s potential contribution to the focus of the study was weighed, with those contributing more included. This was done to avoid “nice to have” but irrelevant questions. Based on these arguments and standard for including questions set, all each question was tested as:

- Should it be asked,
- Is scope and coverage proper,
- Is it free from any ambiguity possible,
- Can the respondents be willing to answer the question (is it not sensitive) and
- Is it not a leading question?

In coming up with the questions, the research was informed by the theoretical constructs as reviewed under literature as well as gaps identified which need to be filled with new knowledge and insights. Validated questions were often used. (See appendix for the questionnaire). Dichotomous and limited open ended questions were posed.

The questionnaire was separated into five main sections covering the major headings, namely: general and demographic information, drug utilisation, pharmacoepidemiology, compliance, and KAP and drug accessibility.
3.9 Validity and Reliability of Study Design and Instrument

In the context of checking validity of the instruments, the researcher posed the following questions: Does the research design allow the investigator to answer the hypothesis? Also, to what extent does the measurement tool truly captures the aspect it was planned to measure?

As validity can be split into internal (could there be other drivers of the characteristic being observed?); presence of which internally invalidates the study as alternative explanations exists and external (can the outcome form the sample be generalized across populations, places or time?). Through rigorous interrogation of each question and going through the comments from the experts in pilot study, conclusion was made that the instrument ensures validity and reliability. In a nut shell, the following assessment benchmark was used for the instrument.

**Table 3.1 Assessing validity**

<table>
<thead>
<tr>
<th><strong>Face validity:</strong></th>
<th>Researcher judged to what extent measurement tool seems to evaluate what it is intended to.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content validity:</strong></td>
<td>the degree to which the concept of the study in general is represented by the tool</td>
</tr>
<tr>
<td><strong>Criterion-related validity:</strong></td>
<td>Here predictive ability and concurrent validity are tested checking the extent to which a tool can predict a variable that is designated a criterion</td>
</tr>
<tr>
<td><strong>Construct validity:</strong></td>
<td>Can the measure confirm a hypothesis emanating from theory based on the study concepts, and to what extent it does so.</td>
</tr>
</tbody>
</table>

In quantitative research, however, statistical test choice is crucial. Chi square, for example is often used to measure the degree of association between two variables. Furthermore, statistical techniques were employed to assess the probability of being wrong in the conclusions and whether inferences can be made and with what confidence level.

**3.9.1 Assessing reliability**

Besides testing validity, reliability is also crucial. Reliability is the extent to which methods are random error free and, therefore able to produce consistent data. In statistics or quantity theory, a measurement or investigation is thought to be dependable if it produces consistent results over repeated testing. Consequently, reliability was assessed through the following lenses.
Table 3.2. Assessing reliability

<table>
<thead>
<tr>
<th><strong>Test-retest reliability:</strong></th>
<th>Same instrument is tested repeatedly twice under as nearly the same conditions as possible. Pilot testing helped with this.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equivalent form reliability:</strong></td>
<td>Making use of dual instruments to capture the same characteristic over the same period and the tools being as similar as is possible. (Literature review).</td>
</tr>
<tr>
<td><strong>Internal consistency reliability:</strong></td>
<td>Here different samples of items being used to measure a phenomenon are compared over the same time period (public and private patients participated).</td>
</tr>
</tbody>
</table>

Furthermore, having checked for reliability of instruments as discussed above; a statistical confirmation for the reliability of the measures is necessary. Cronbach’s alpha is one such measure. Reliability analysis allows the researcher to determine the extent to which a scale produces consistent results if the measurements are repeated.

Since in some instances there are two or more questions that were summed to determine a specific variable, reliability analysis was conducted. Reliability analysis is determined by examining the proportion of systematic variation in a scale. If all the participants are consistent in the way they respond to the several questions, the gauge yields reliable results and is considered reliable.

Cronbach's alpha is a statistic used to determine the internal consistency. Therefore, Cronbach's alpha rises as the inter-correlations among the items included in the analysis increase. If the questions on the survey or items being tested have very high inter-correlations, the conclusion is that the questions are considered to be measuring different dimensions of the same construct. The higher the alpha, the more reliable is the instrument being tested. A general rule for measuring reliability is: Alpha above .70 is considered reliable, Alpha above .60 is probably reliable, but should consider evaluating each question to determine if one could raise the alpha level by eliminating it from the analysis. On the other hand, Alpha below .59 is considered not reliable. Consider either eliminating some elements from the instrument to raise reliability or revise the instrument to increase its reliability.
The above tests helped streamline the instrument to be used in the measurement and ensuring that the measurement questions met the data needs meet the objectives of the study. The outcome of pilot testing and subsequent tests as discussed above guided revision of the questionnaire. The revised instruments were then utilised and the collected data was captured into Microsoft excel programme.

3.10 Data Analysis Techniques

Data analysis is the ability to disentangle data, explaining the nature of the constituents and the relationship among them. Both qualitative and quantitative techniques were employed to present the results and support the empirical discussion, with a bias towards quantitative analysis. Quantitative analysis techniques dominated this process. Such techniques range from “creating simple tables or diagrams that show the frequency of occurrence; establishing statistical relationships between variables through to complex statistical modeling” (Saunders et al., 2003:327). It is essential to ensure that the data analysis method fits with the research design and research paradigm (Terre Blanche et al., 2002). The process of analysis begins after the data has been collected. Throughout the analysis phase numerous interrelated procedures were performed to summarise and rearrange the data. Important parts of data analysis include “editing, coding and processing of data” (Zikmund, 2003:453).

3.11. Editing of data

The data was edited to ensure that it is ready for coding and transfer to data storage. According to Zikmund (2003), editing entails checking and adjusting the data to cater for omissions, legibility, consistency and reliability. During the editing of the data, the raw data, and questionnaires, were checked for mistakes made by either the interviewer or the respondent. Cant et al (2005) added that, the main function of editing is to ensure that data is accurate, consistent with the intention of the questions, uniformly entered, completed and arranged to simplify the coding and tabulation. Pilot testing and thorough training conducted however helps in reducing mistakes, especially on the part of the interviewer.
3.12. Coding of data

Coding denotes to the act of allocating a code or symbol, usually a number (for quantitative analysis), to each possible answer on a particular question. Cant et al (2005) notes that coding is essential for the purpose of transforming the answers given by the participants on the survey questions into codes or symbols that can easily be managed by statistical analysis software package. Pre-coding was used because the researcher knew what the answer categories were before data collection occurs. The coded data was processed and analysed through the SPSS statistical software.

3.13. The analytical techniques

In this study the units of analysis are patients. For qualitative analysis corroboration technique was employed. Here, the researcher checked for evidence that tends to support a proposition that is already supported by some preliminary evidence, thus checking the proposition. The central question is one which statistics are essential for analysing the data at hand—whether to follow parametric or non-parametric statistics. Making use of wrong or weak statistical procedures or techniques may invalidate the analysis and any inferences drawn from the results.

Furthermore, the following considerations were taken into account: There was need to look at the distribution of the data; that is, testing for normality. If data is supposed to take parametric statistics should be roughly normal. The Skewness and Kurtosis measures best inform the distribution of the data. If skew and kurtosis are both approximately equal to 1.0 each the distribution is relatively normal. In this case parametric tests perform well. However, if a distribution deviates distinctly from normality non-parametric statistics should be considered to avoid the risk that the statistic will be inaccurate under parametric tests.

Having tested the distribution of the data, correlation among the variables was tested. For normally distributed variables a correlation is useful to inspect the relationship between two (or more) interval variables. The Pearson correlation is checked, with the Spearman correlation used at least one of the
variables are not assumed to be normally distributed and are interval (although assumed to be ordinal). For the latter, ranks of the values of the variables are considered. Percentages and proportions were used to describe categorical variables while means and standard deviations were used for numerical variables. The basic analysis also considered frequencies of the responses to each question, reporting percentages.

One other informative analysis is regression analysis. A simple regression assuming linearity enables an inspection of relationship between one normally distributed interval independent variable and one normally distributed dependent interval variable. There is flexibility to add more predictors to the model and estimate a multiple regression with assumptions and procedures similar to simple regression. In some instances, under multiple regressions as in this study, there may be too many variables to the extent that a check needs to be done on whether they are all relevant to be included in the model and a model was developed to explain chronic pharmacotherapy.

The following model has been estimated:

\[ BP = D + AH_{drugs} + C + K + A + P + AV + AF + \epsilon \quad \ldots \quad (2) \]

Where:

- \( BP \) = hypertension/ the level of BP and both SBP and DBP will be used interchangeably, therefore two models will be estimated
- \( D \) = demographics
- \( AH_{drugs} \) = utilisation of Anti-hypertensive drugs
- \( C \) = Compliance with medication
- \( K \) = Knowledge about the medicines and the condition
- \( A \) = attitude towards the medications
- \( P \) = Practice of lifestyle modification
- \( AV \) = Availability of medications
- \( AF \) = Affordability

Given the nature of the study, of having too many variables that can predict a certain phenomenon, hierarchical regression was also employed. Hierarchical regression is linear in nature with nested levels allowing separation of variables based on their class (e.g. demographic versus perception). By this approach
successive linear models are built by way of adding more predictive variables at each stage. The advantage of this model it is possible to control for the effects of covariates or to test the effects of certain predictors independent of the influence of others. Relevance of a class of variables as predictors can easily be tested. In this study were variables have been categorised as utilisation, compliance, KAP and accessibility it becomes handy to employ such a technique.

Logistic regression modelling was also employed to identify predictors of the likelihood of compliance/adherence, knowledge and drug accessibility given the nature of dependant variable that could not suit other forms of regression well. Under this approach the predictors can either be numerical or categorical, however the dependent should normally be coded as 0 (non-compliance/adherence) or 1 (compliance/adherence). Odds ratios, confidence intervals, and $P$ values (2-tailed) were calculated for each variable in the model to quantify the association between the factor of interest and the likelihood of proper pharmacotherapy while controlling for other variables in the model.

Overall, confidence in the relationships depicted and associations found is necessary for better policy recommendations. Statistically this can be checked using the Chi-square goodness of fit: this test is done to test the significance of the relationship among variables. Also called Pearson's chi-square test or the chi-square test of association; used to discover the strength of relationship between two categorical variables. All the tests were done at 5% significance level.

3.14. Results and Data Analysis

All the data were collected and exposed to expressive statistical analysis to obtain the means and standard deviation. Commonly used drug groups in study subjects were documented. Costs of commonly used hypertensive drugs were reported as well as the percentage of people with controlled BP both from the public and private sector. The trend as in generic or brand prescribing was accessed. Data for continuous, closely symmetrical variables were analyzed using standard descriptive methods to estimate means ± SD. Patients who used an antihypertensive medication with only one active ingredient categorised as receiving
monotherapy as compared to polytherapy (taking more than 1 active ingredient either in 1 combination pill or in 2 different single pills). Characteristics of Hypertensive Adults Aged ≥18 Years in Harare was reported and the following aspects were included mean age, age groups, gender, Body mass index, mean (SE), Co morbidities, bp systolic, dystolic and HTN status(controlled). Most Frequently Used Antihypertensive Medications frequency was reported.

Side effects associated with each class of antihypertensive agent were reported. To avoid losing statistical power, the data provided by private and public patients were pooled together. Average cost of antihypertensive drugs per encounter was established. Knowing the proportion of patients with relevant co-morbid conditions is crucial for comparing compliance, persistence, and outcomes among different study populations. Pearson’s Chi-square tests were used to measure significant relationships. Comparisons for which $P$-values were below 0.05 were considered statistically significant.

HTN prevalence and control estimates were analyzed by demographic factors sex, age group, education level, income, health insurance status and health factors such as diabetes and obesity. Univariate t-tests were used to assess significant differences between groups. Trend tests were used to evaluate associations with age and education.

### 3.15 Ethical considerations

The general ethical rule is that the research design should not subject the research participants to discomfort, damage or any other substantial disadvantage. In this research permission to access the required data was sought and explanation to the use of the data was given. In the context of research, ethics refer to the appropriateness of the researcher’s behaviour in relation to the rights of those that will be participating in the research or those that will be affected by it. In this research, research ethics that relates to designing and gaining access to the respondents and facilities, collecting data, processing and storing the data, analysing data and writing up the research findings in a moral and responsible way was observed.
All the general ethical issues in research were observed. This includes privacy of possible and actual participants, non-coerced nature of participation and the right to withdraw partially or completely from the process. Also consent was sought, and possible deception of participants avoided. In addition conservation of the privacy of data provided by individuals or identifiable participants and their anonymity, reactions of participants to the way in which the researcher seek to collect data, including embarrassment, stress, discomfort, pain and harm, effects on participant of the way in which data is used, analysed and reported were treated in accordance to due ethical procedures. The researcher in this study made an effort to maintain good behaviour and Identity of patients were kept confidential.

Approval for the study was obtained from Joint Research Ethical Committee (JREC) at Parirenyatwa Hospital/UZ College of Health Sciences. Institutional permission was requested before accessing any data, or conducting questionnaires with patients. Research participants were invited verbally and an informed consent was provided in writing.
CHAPTER FOUR

RESULTS

4.0. Introduction

This chapter set out to implement the data analysis techniques espoused in the preceding chapter. Both quantitative and qualitative methods were employed with bias towards the former. The analysis follows the five key sections from the survey instrument, starting with demographics then drug utilisation and pharmacoepidemiology; medication compliance; knowledge, attitude and practice; and finally medicines accessibility. The approach used ensured 100% response rate, (400 participants). Before looking closely at chronic therapy of HTN the demographics of the sample were investigated.

4.1. Demographics

![Figure 4.1. Age categorisation](image)

Figure 4.1. Age categorisation
### Table 4.1. Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Number of respondents</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>158</td>
<td>39.5</td>
</tr>
<tr>
<td>Females</td>
<td>242</td>
<td>60.5</td>
</tr>
<tr>
<td><strong>Uncontrolled BP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SBP</td>
<td>228</td>
<td>57.1</td>
</tr>
<tr>
<td>DBP</td>
<td>114</td>
<td>28.6</td>
</tr>
<tr>
<td><strong>Risky waist</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>57</td>
<td>37.1</td>
</tr>
<tr>
<td>Women</td>
<td>187</td>
<td>77.1</td>
</tr>
<tr>
<td><strong>Body mass index</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>150</td>
<td>37.5</td>
</tr>
<tr>
<td>Overweight</td>
<td>145</td>
<td>36.2</td>
</tr>
<tr>
<td>Obese</td>
<td>105</td>
<td>26.3</td>
</tr>
<tr>
<td><strong>Family member with BP</strong></td>
<td>238</td>
<td>59.6</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>154</td>
<td>38.4</td>
</tr>
<tr>
<td>Secondary</td>
<td>188</td>
<td>47.2</td>
</tr>
<tr>
<td>Tertiary</td>
<td>58</td>
<td>14.4</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>278</td>
<td>69.4</td>
</tr>
<tr>
<td>Housewife</td>
<td>60</td>
<td>15.1</td>
</tr>
<tr>
<td>Retiree/Pensioner</td>
<td>49</td>
<td>12.4</td>
</tr>
<tr>
<td>Teacher</td>
<td>18</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Co morbidity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>116</td>
<td>28.9</td>
</tr>
<tr>
<td>Heart diseases</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>Asthma</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>Arthritis</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>HIV</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td><strong>Smoking and Alcohol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently Smoke</td>
<td>21</td>
<td>5.3</td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>33</td>
<td>8.3</td>
</tr>
<tr>
<td>Currently drinks alcohol</td>
<td>29</td>
<td>7.3</td>
</tr>
<tr>
<td>Ex-alcohol</td>
<td>32</td>
<td>8.0</td>
</tr>
</tbody>
</table>

As shown in Table 4.1, majority (60.5%) were females as gender can affect HTN control. Only slightly above a third had normal body mass index. On waist size, female participants were at more risk than their male counterparts. Controlled HTN was not associated with educational level. The genetic component of HBP came up in this study where 60% reported family history of HBP. Diabetes was the popular co-morbidity. The age group of 61-70 years
contained most of the patients (26.63%), with the least among the young (below the age of thirty) as shown on Figure 4.1

### 4.2. Hypertension Status

The study set out to evaluate chronic therapy of HTN. As a first step, frequencies of the two types of HTN- systolic and diastolic were obtained. Systolic BP was generally not under control with majority 57.1% of the patients are at uncontrolled levels, while 71.4 have their diastolic BP under control Looking at age and the level of HTN, the study revealed that the highest incidences of uncontrolled HTN are in the older age groups 61-70 and the above 70 years age groups which combined represents 53.1% as show on Table 4.2.

Table 4.2. Systolic Blood Pressure and Age cross tabulation

<table>
<thead>
<tr>
<th>Under control</th>
<th>% within SBP</th>
<th>4.8%</th>
<th>7.7%</th>
<th>16.7%</th>
<th>19.6%</th>
<th>25.0%</th>
<th>26.2%</th>
<th>100.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young-Below 30 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-40 years</td>
<td></td>
<td>57.1%</td>
<td>46.4%</td>
<td>42.4%</td>
<td>41.3%</td>
<td>39.6%</td>
<td>44.0%</td>
<td>42.6%</td>
</tr>
<tr>
<td>41-50 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-60 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61-70 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 70 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.7%</td>
<td>6.6%</td>
<td>16.8%</td>
<td>20.8%</td>
<td>28.3%</td>
<td>24.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The case is different with diastolic BP as under all age groups, majority have the condition under control than not. In contrast majority of patients with uncontrolled DBP fall under the
age groups below 60 years, and only 46% are in the elderly category (the top two age groups) as shown on Table 4.3.

Table 4.3. Diastolic Blood Pressure and Age cross tabulation

<table>
<thead>
<tr>
<th></th>
<th>Young-Below 30 years</th>
<th>31-40 years</th>
<th>41-50 years</th>
<th>51-60 years</th>
<th>61-70 years</th>
<th>Over 70 years</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under control</td>
<td>% within DBP</td>
<td>3.9%</td>
<td>5.7%</td>
<td>15.7%</td>
<td>19.9%</td>
<td>28.5%</td>
<td>26.3%</td>
</tr>
<tr>
<td></td>
<td>% within Age Groups</td>
<td>78.6%</td>
<td>57.1%</td>
<td>66.7%</td>
<td>70.0%</td>
<td>75.5%</td>
<td>74.0%</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>% within DBP</td>
<td>2.7%</td>
<td>10.6%</td>
<td>19.5%</td>
<td>21.2%</td>
<td>23.0%</td>
<td>23.0%</td>
</tr>
<tr>
<td></td>
<td>% within Age Groups</td>
<td>21.4%</td>
<td>42.9%</td>
<td>33.3%</td>
<td>30.0%</td>
<td>24.5%</td>
<td>26.0%</td>
</tr>
</tbody>
</table>

The respondents were adult patients with a mean age of 60 years. Systolic HTN is prominent compared to diastolic given that on average patients have high systolic (mean 146) than DBP (mean 84). On the other hand, majority of the respondents were overweight with a mean body mass index of 27.65Kg/m², with maximum as extreme as 55. These descriptive statistics are shown on Table 4.4

Table 4.4. Descriptive Statistics for Age, SBP, DBP and BMI

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>398</td>
<td>20</td>
<td>99</td>
<td>60.07</td>
<td>15.380</td>
</tr>
<tr>
<td>BP_S</td>
<td>399</td>
<td>100</td>
<td>225</td>
<td>146.33</td>
<td>21.708</td>
</tr>
<tr>
<td>BP_D</td>
<td>399</td>
<td>55</td>
<td>147</td>
<td>83.61</td>
<td>15.796</td>
</tr>
<tr>
<td>BMI</td>
<td>394</td>
<td>18</td>
<td>55</td>
<td>27.65</td>
<td>5.908</td>
</tr>
</tbody>
</table>
### Table 4.5. BP Status in Diabetic Patients

<table>
<thead>
<tr>
<th>Systolic BP</th>
<th>Diabetes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under control</td>
<td>11.7%</td>
<td>31.3%</td>
<td></td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>16.8%</td>
<td>40.2%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diastolic BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under control</td>
</tr>
<tr>
<td>Uncontrolled</td>
</tr>
</tbody>
</table>

### Table 4.6. BP Status in Different BMI Values and Gender

<table>
<thead>
<tr>
<th>Normal</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under control</td>
<td>17.8%</td>
<td>15.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>19.8%</td>
<td>20.6%</td>
<td>16.2%</td>
</tr>
<tr>
<td>DBP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under control</td>
<td>28.4%</td>
<td>25.5%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>9.3%</td>
<td>10.8%</td>
<td>8.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>
Over 51% of the patients believes that their condition is well controlled as shown on Figure 4.2.

**Figure 4.2. Status of BP According to the Patient**

4.3. Pattern of Use of Antihypertensive Drugs

Majority of the patients (half of the sample) have been using antihypertensive drugs for the past 5 years, with about 13% not remembering when they started using anti-HTN drugs as shown on Figure 4.3 below.
Figure 4.3. Period of Use of Antihypertensive Drugs

The commonly used drugs were hydrochlorothiazide, nifedipine, enalapril, frusemide, atenolol, losartan, amilodipine and spironolactone as shown on Table 4.7.

Table 4.7. The Commonly Used Antihypertensive Drugs

<table>
<thead>
<tr>
<th>Medicine</th>
<th>(% times mentioned)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydrochlorothiazide</td>
<td>56.4</td>
</tr>
<tr>
<td>nifedipine</td>
<td>51.1</td>
</tr>
<tr>
<td>enalapril</td>
<td>28.3</td>
</tr>
<tr>
<td>frusemide</td>
<td>13.9</td>
</tr>
<tr>
<td>atenolol</td>
<td>12.4</td>
</tr>
<tr>
<td>losartan</td>
<td>8.9</td>
</tr>
<tr>
<td>amilodipine</td>
<td>8.1</td>
</tr>
<tr>
<td>spironolactone</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Combination drugs (76%) were more frequently used than monotherapy as shown on Figure 4.4. The popular combination therapy was HCT and Nifedipine.
Figure 4.4. Pharmacotherapy Categorisation
The effect of category of therapy on SBP was assessed as shown on Table 4.8 below

Table 4.8. Cross tabulations of Category of Therapy and SBP

<table>
<thead>
<tr>
<th>SBP</th>
<th>Under control</th>
<th>Uncontrolled</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
</tr>
<tr>
<td>SBP</td>
<td>Monotherapy</td>
<td>Polytherapy</td>
<td>Polytetrapy (3 or more drugs)</td>
</tr>
<tr>
<td>Under control</td>
<td>39</td>
<td>78</td>
<td>54</td>
</tr>
<tr>
<td>% within SBP</td>
<td>22.8%</td>
<td>45.6%</td>
<td>31.6%</td>
</tr>
<tr>
<td>% within Therapy</td>
<td>41.1%</td>
<td>44.8%</td>
<td>41.5%</td>
</tr>
<tr>
<td>% of Total</td>
<td>9.8%</td>
<td>19.5%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>56</td>
<td>96</td>
<td>76</td>
</tr>
<tr>
<td>% within SBP</td>
<td>24.6%</td>
<td>42.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>% within Therapy</td>
<td>58.9%</td>
<td>55.2%</td>
<td>58.5%</td>
</tr>
<tr>
<td>% of Total</td>
<td>14.0%</td>
<td>24.1%</td>
<td>19.0%</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td>174</td>
<td>130</td>
</tr>
<tr>
<td>% within SBP</td>
<td>23.8%</td>
<td>43.6%</td>
<td>32.6%</td>
</tr>
<tr>
<td>% within Therapy</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>23.8%</td>
<td>43.6%</td>
<td>32.6%</td>
</tr>
</tbody>
</table>
Using chi-square to check the significance of association, the study concludes that there is no significant association (Pearson Chi-square Asymp. Sig of 0.781 > 0.05) between therapy category and SBP levels as shown on Table 4.9

**Table 4.9. Chi-Square Tests for Category of therapy and SBP**

<table>
<thead>
<tr>
<th>Value</th>
<th>Degrees of freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>0.494</td>
<td>2</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>0.494</td>
<td>2</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>0.000</td>
<td>1</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>399</td>
<td></td>
</tr>
</tbody>
</table>

Phi and Cramer’s V statistics for SBP the association is very weak, at 3.5% (0.035) as shown on Table 4.10.

**Table 4.10. Symmetric Measures for Category of Therapy and SBP**

<table>
<thead>
<tr>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phi</td>
<td>0.035</td>
</tr>
<tr>
<td>Cramer’s V</td>
<td>0.035</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>399</td>
</tr>
</tbody>
</table>

Significance of association as well as the strength of association was also tested between DBP and therapy category as shown on Table 4.11. More patients have controlled DBP than not, with only 23.8% under mono-therapy.
Table 4.1. DBP and Therapy category cross tabulation

<table>
<thead>
<tr>
<th>DBP</th>
<th>Therapy</th>
<th>Count</th>
<th>Mono-therapy</th>
<th>Polytherapy (2 drugs)</th>
<th>Polytherapy - (3 or more drugs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under control</td>
<td></td>
<td></td>
<td>57</td>
<td>128</td>
<td>100</td>
<td>285</td>
</tr>
<tr>
<td></td>
<td>% within DBP</td>
<td></td>
<td>20.0%</td>
<td>44.9%</td>
<td>35.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% within Therapy</td>
<td></td>
<td>60.0%</td>
<td>73.6%</td>
<td>76.9%</td>
<td>71.4%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td></td>
<td>14.3%</td>
<td>32.1%</td>
<td>25.1%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td></td>
<td></td>
<td>38</td>
<td>46</td>
<td>30</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>% within DBP</td>
<td></td>
<td>33.3%</td>
<td>40.4%</td>
<td>26.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% within Therapy</td>
<td></td>
<td>40.0%</td>
<td>26.4%</td>
<td>23.1%</td>
<td>28.6%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td></td>
<td>9.5%</td>
<td>11.5%</td>
<td>7.5%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td></td>
<td>95</td>
<td>174</td>
<td>130</td>
<td>399</td>
</tr>
<tr>
<td></td>
<td>% within DBP</td>
<td></td>
<td>23.8%</td>
<td>43.6%</td>
<td>32.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% within Therapy</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td></td>
<td>23.8%</td>
<td>43.6%</td>
<td>32.6%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Pearson chi-square with p-value of 0.015 indicates that there is a strong association between DBP level and the therapy category as shown on Table 4.12.

Table 4.12. Chi-Square Tests for DBP and Therapy Category

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Degrees of freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>8.392</td>
<td>2</td>
<td>0.015</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.097</td>
<td>2</td>
<td>0.017</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>7.136</td>
<td>1</td>
<td>0.008</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>399</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Phi and Cramer’s V points to a relatively strong association of about 15% between DBP level and kind of therapy received as shown on Table 4.13.
Table 4.13. Symmetric Measures for DSP and Therapy Category

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phi</td>
<td>0.145</td>
<td>0.015</td>
</tr>
<tr>
<td>Cramer's V</td>
<td>0.145</td>
<td>0.015</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>399</td>
<td></td>
</tr>
</tbody>
</table>

Some patients had been taking other medicines besides the anti-hypertensive discussed above. The popular drugs were: metfarmin (19%); diclafenac (14%); asa (13%); glibeclamide (12%), magnesium triscilicate (11%), indomethacin (10%) and salbutamal (sal) 9%). The most popular drugs were taken once a day (72%) followed by twice a day (22%) and three times (6%) which should not be expected to put too much burden on the patient. Therefore adherence and persistence should be possible. Generic names were more commonly used (93%) than the trade names. Cardio protective prophylactic aspirin was prescribed to only 13% of the people. Nearly 80% of the patients are having a repeat prescription from government hospitals and only 30% from private sector. With a life condition, it can be common to have medicine changes; however in this study it is revealed that 33% have had their medicines changed. The two main reasons were side effects and BP not being under control. One of the explanations to limited cases of changing medicines is the limited nature of problems with the medicine.

4.4. The commonly suspected adverse effects

A fifth (19, 3%) has experienced problems with their medicines. In this study the most common side effects were headache (43%), dizziness (21%), followed by sexual dysfunction (11%), swelling of legs (21%) and others (17%). The other side effects included body weakness, cramps, dry mouth, numbness, feeling hot, feeling sleepy, heart burn, heart rate increase, hunger, coughing, neuropathy, no appetite, general body malaise, dyspnoeic, oedema of the feet, painful legs, blurred vision, palpitation, stomach upset and sweating. The culprit drugs were mainly HCT, Nifedipine and Atenolol.
4.5. The extent to which patients are compliant with drug therapy

Almost 41% admitted to have stopped taking their drugs at some point in time. The reasons for stopping taking drugs are shown on Table 4.10

Table 4.14. Reasons for not Always Taking Drugs

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forgetting to take medicines</td>
<td>66</td>
<td>36.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Side effects</td>
<td>29</td>
<td>16.1</td>
<td>52.8</td>
</tr>
<tr>
<td>Complexity of the therapeutic regimes</td>
<td>17</td>
<td>9.4</td>
<td>62.2</td>
</tr>
<tr>
<td>Lack of money to purchase the medicines</td>
<td>45</td>
<td>25.0</td>
<td>87.2</td>
</tr>
<tr>
<td>Unavailability of the medicines</td>
<td>23</td>
<td>12.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

On self-reported compliance 77% said they take their medicines as recommended. Only very few (5.3%) patients always find it inconvenient or difficult to take medicines exactly as recommended, adding up to nearly 34.5% who at least sometimes find it inconvenient. Majority (around 60.2%) however never found it inconvenient. With such view compliance is possible; which is a step in the right direction towards managing and controlling HTN condition. Only 31.3% of the patients take their medicines at a particular identical time. In other words they have incorporated taking medication to their daily schedule to make it part of their life styles. However there has been limited adaptation of medicine taking to any
specific daily activities. On the understanding of how antihypertensive drugs work or how the condition is controlled 19, 1% said they stop taking their medicines when they feel their BP was under control.

4.6. Knowledge, attitude and practice about hypertension and drug therapy

Patients are not only relying on the prescribed medicines, 62, 8% use other measures to control their blood levels. The measures include dietary approach (37, 6%); exercising (23.6%); and only 18.4 use herbs as shown on Table 11. The herbs being used included garlic, aloe, avocado leaves, fig tree roots, black jack, milu tea, tiangi, muzumbani, cinnamon powder, Chinese tea, lemon grass, moringa, ginger, gum trees leaves and musawu tree leaves.

Only 10.6% of the patients have a BP machine of their own. The machine is handy because it reduces travelling to health centres regularly given the nature of the condition. Almost 47% did not know normal ranges of BP. When asked about HTN facts that they know the answers included affect old age people, affects all ages, better to take drugs than have a stroke, can cause decrease in libido, can cause headache, can cause sexual dysfunction, causes diabetes, diabetes is caused by BP drugs, difficult to manage, God can cure BP, herbs are dangerous, herbs work, it is a deadly disease, it is a harsh condition and the medicine gives problems.

Nearly 28% said they get their information during socialising hence the need to educate everyone about HTN. Almost 34% said HTN is curable. Doctors were widely consulted by the patients as shown on Table 4.12. Most patients visited doctors after three months for check-ups and replenishment of medicines. There is also a sizable (16%) number that visits only when there are problems.
Table 4.1. Non-Pharmacologic Control of HBP

<table>
<thead>
<tr>
<th></th>
<th>N and (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Any other measures?</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>251 (62.8)</td>
</tr>
<tr>
<td>No</td>
<td>149 (37.2)</td>
</tr>
<tr>
<td><strong>Do you follow any dietary approach?</strong></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>73 (18.4)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>175 (43.7)</td>
</tr>
<tr>
<td>Strictly</td>
<td>152 (37.6)</td>
</tr>
<tr>
<td><strong>How often do you do physical exercise?</strong></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>122 (30.4)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>184 (46.0)</td>
</tr>
<tr>
<td>Always</td>
<td>94 (23.6)</td>
</tr>
<tr>
<td><strong>Do you use herbs?</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>74 (18.4)</td>
</tr>
<tr>
<td>No</td>
<td>326 (81.6)</td>
</tr>
<tr>
<td><strong>Do you have a BP testing machine?</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42 (10.6)</td>
</tr>
<tr>
<td>No</td>
<td>358 (89.4)</td>
</tr>
</tbody>
</table>

Figure 4.6. Health Professionals Helping in HBP Management

- Pharmacist: 30%
- Doctor: 59%
- Nurse: 11%
Table 4.16. Knowledge on Hypertension Risk Factors

<table>
<thead>
<tr>
<th>Risky factor</th>
<th>(N) % of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive salt intake</td>
<td>(32) 8.0</td>
</tr>
<tr>
<td>Excessive alcohol intake</td>
<td>(1) 0.3</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>(8) 2.0</td>
</tr>
<tr>
<td>Obesity</td>
<td>(14) 3.5</td>
</tr>
<tr>
<td>Smoking</td>
<td>(14) 3.5</td>
</tr>
<tr>
<td>Stress</td>
<td>(47) 11.8</td>
</tr>
<tr>
<td>Don't know</td>
<td>(240) 60.0</td>
</tr>
<tr>
<td>Other</td>
<td>(15) 3.8</td>
</tr>
<tr>
<td>More than one of the above but not all</td>
<td>(25) 6.1</td>
</tr>
<tr>
<td>All of the above factors</td>
<td>(4) 1.0</td>
</tr>
</tbody>
</table>

Stroke was the most known HTN complication and taking of medicines was the popularly practised way of preventing HBP complications as shown on Table 4.14

Table 4.17. Knowledge on HBP Complications and Preventive Measures

<table>
<thead>
<tr>
<th>Complication</th>
<th>(N) % of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Hypertrophy with heart failure</td>
<td>(6) 1.5</td>
</tr>
<tr>
<td>Heart Attack</td>
<td>(18) 4.5</td>
</tr>
<tr>
<td>Stroke</td>
<td>(128) 32.1</td>
</tr>
<tr>
<td>Eye problems</td>
<td>(4) 1.0</td>
</tr>
<tr>
<td>Renal problems</td>
<td>(5) 1.3</td>
</tr>
<tr>
<td>I don't know</td>
<td>(206) 51.3</td>
</tr>
<tr>
<td>Other</td>
<td>(16) 4.0</td>
</tr>
<tr>
<td>More than one of the above but not all</td>
<td>(17) 4.3</td>
</tr>
<tr>
<td>Preventative Measures</td>
<td></td>
</tr>
<tr>
<td>Reduce salt intake</td>
<td>(40) 10.0</td>
</tr>
<tr>
<td>Reduce/ stop alcohol intake</td>
<td>(2) 0.5</td>
</tr>
<tr>
<td>Doing exercise</td>
<td>(5) 1.3</td>
</tr>
<tr>
<td>Reduce weight</td>
<td>(6) 1.5</td>
</tr>
<tr>
<td>Reduce/ stop smoking</td>
<td>(4) 1.0</td>
</tr>
<tr>
<td>Taking medication</td>
<td>(60) 15.1</td>
</tr>
<tr>
<td>I don't do anything</td>
<td>(239) 59.7</td>
</tr>
<tr>
<td>Others</td>
<td>(16) 4.0</td>
</tr>
<tr>
<td>More than one of the above but not all</td>
<td>(26) 6.4</td>
</tr>
<tr>
<td>All of the above</td>
<td>(2) 0.5</td>
</tr>
</tbody>
</table>
Over two-thirds get help in managing their condition. Family support is was very strong—especially from children and spouses. Only one percent of the patients consider all unwarranted Na intake; unnecessary alcohol consumption; physical idleness; obesity; smoking and stress as risk factors. Stress was the most known risk fact, followed by excessive salt intake as shown on Table 4.13.

Education has been mentioned by 66.3% as crucial piece to ensuring dietary approaches are followed. Individuals need to be informed of better selection of food. Again self-discipline was coming up more as a way to improve uptake of dietary approaches (2%), second to education (66.3%).

To initiate discussion to find out the attitudes of the patients towards the condition and drug therapy, their fears on diagnosis were asked. Nearly 30% are worried about death and about 27% fear related diseases as shown on Table 4.15 These two fears often promote persistence and compliance with medication unlike the fears of side effects of medication and cost of treatment. From this analysis it can be concluded that the patients have a negative attitude about the condition and because of such a negative attitude pharmacotherapy is unlikely to be effective.

<table>
<thead>
<tr>
<th>Worry/ fear</th>
<th>(N) % of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of death</td>
<td>(118)29.4</td>
</tr>
<tr>
<td>Fear of other related diseases</td>
<td>(109)27.2</td>
</tr>
<tr>
<td>Cost of treatment</td>
<td>(53)13.2</td>
</tr>
<tr>
<td>Side effects of medication</td>
<td>(66)16.6</td>
</tr>
<tr>
<td>Other</td>
<td>(50)12.6</td>
</tr>
<tr>
<td>More than 1 of the above</td>
<td>(4)1.0</td>
</tr>
</tbody>
</table>
Overall, over 83.3 of the patients consider HTN as serious condition that needs every possible attention. Likewise this view/perception promotes adherence to medication. 43. 9% did not know the acceptable normal range for BP and 34% said HBP was curable. The common causes of HTN form the study were stress (27.5%), hereditary (21.3%), pregnancy (6.2%) and loss of a family member through death (4%). Imperative to note here is that other numerous causes cited are related to stress, including some prominent ones reported here like death in a family. Headache, chest pains, palpitations, dizziness are reported as the key symptoms of HBP compared to fatigue, blurred vision, and dizziness for low BP. Provision of health education programmes is cited as the key to increase knowledge of the condition by over 65% of the patients. Almost 62% of this sample had a negative attitude towards HTN chronic therapy evidenced by their comments such as why taking medicine everyday if it cannot cure, too many medicines- reduce the number, too many side effects, they make you feel sick, they cause diabetes, they are expensive, it is difficult to take medicines every day, the condition is difficult to control, taking medicines everyday will kill me, supply medicines in liquid form, cause sexual dysfunction, HTN is a killer disease, pained by taking medication for the rest of my life, medicines are dangerous, medicine can worsen the health of people, make the medicine to be in one pill, I hope to stop these drugs, HBP more serious than HIV and BP its finishing my children’s money.

4.7. Drug accessibility

On average the patients are spending US$27.15 per month. Given the chronic nature of the conditions this puts a financial burden on many; most of them are unemployed (69%) and are paying by cash (71.8%) as shown on Table 4.13. However, over 77, 4% report that they had never failed purchasing medicines, indicating that accessibility is at reasonable levels. Furthermore about 69% had never failed to find the medicines they wanted from the private pharmacies. This should be interpreted with caution as practitioners usually prescribe
medicines that are generally available - this does not mean the medicines being obtained are the best for the condition and for the unique characteristics of the patients.

**Figure 4.7. Payment Methods**

![Payment Methods Pie Chart]

**Figure 4.8. Sources of Drugs**

Pharmacies are playing a significant role in distribution of HTN drugs in Harare. From the survey over 63.4% of the patients obtain their drugs from private pharmacies, while 19% get from clinics and 18% from central hospitals. When asked about how to improve affordability, the patients’ answers included controlled prices on chronic medicines, government to
subsidise the prices, donor funded, free medication as for ARVs, people with HTN to have medical insurance, health fund from government, imitate HIV programmes like the AIDS levy. On availability patients’ suggestions included a chronic disease policy which should insure availability at clinic level as well as at government central hospitals and to imitate infectious diseases programmes like TB, malaria and HIV AIDS.

4.8. Regression analysis

The following model has been estimated:

\[ BP = D + AHdrugs + C + K + A + P + AV + AF + \varepsilon \]  

Where:
- \( BP \) = hypertension/ the level of BP and both SBP and DBP will be used interchangeably, therefore two models will be estimated
- \( D \) = demographics
- \( AHdrugs \) = utilisation of Anti-hypertensive drugs
- \( C \) = Compliance with medication
- \( K \) = Knowledge about the medicines and the condition
- \( A \) = attitude towards the medications
- \( P \) = Practice of lifestyle modification
- \( AV \) = Availability of medications
- \( AF \) = Affordability

Here the model tested the effect of use of antihypertensive drugs, compliance, knowledge, attitude, practice, availability and affordability on the level of BP (both systolic and diastolic). With this approach it was possible to identify the effect of chronic therapy (use of the drugs, attitudes, knowledge, affordability, availability of chronic therapy) on HTN condition.

Most importantly it was easy and possible to also control for other variables that are unique to the individual patient (demographics) such as age, BMI, waist size, smoking and alcohol intake habits, whether family member has HBP or not as well as the patient’s diabetes status among others that have possible effect on BP. In that case a hierarchical regression was implemented- first group of factors being demographics, then the second group of factors being chronic therapy related factors and so on in the categorisation reflected in the survey instrument.
4.8.1. Model A- Dependent variable in systolic BP

\[ SBP = 229.36 + D[Diabetes(1.743)] + C + K[condition(−2.850)] + A + P + AV + AF \ldots (4) \]

The model fails to explain sufficiently systolic BP with two factors diabetes under demographics and knowledge of the condition being significant in explain the levels of SBP.

### Table 4.19. Model Summary of SBP

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.344</td>
<td>0.119</td>
<td>0.051</td>
<td>23.369</td>
</tr>
<tr>
<td>2</td>
<td>0.452</td>
<td>0.205</td>
<td>0.106</td>
<td>22.682</td>
</tr>
<tr>
<td>3</td>
<td>0.467</td>
<td>0.218</td>
<td>0.088</td>
<td>22.904</td>
</tr>
<tr>
<td>4</td>
<td>0.483</td>
<td>0.233</td>
<td>0.063</td>
<td>23.222</td>
</tr>
<tr>
<td>5</td>
<td>0.487</td>
<td>0.237</td>
<td>0.037</td>
<td>23.541</td>
</tr>
</tbody>
</table>

4.8.2. Model B- Dependent variable is Diastolic BP

\[ DBP = 35.07 + D[BMI(0.243) + ALCO(0.172) + Diabetes(0.186)] + C[Takemedicinesrecomended times (−0.195)] + (sametakingtime(−0.191) + (take medicine bp under control(−0.256)] + K + A (exc(−0.217) + P + AV + AF \ldots (5) \]

The hierarchical model explains 37.1% (adjusted 21%) of the variations in diastolic BP with key factors coming from: D (Demographics): with the following three factors increasing DBP in patients: BMI, alcohol taking and diabetes.

C (compliance factors): taking medicines at recommended times; taking medication approximately the same time and taking medicines even BP under control. All these reduce the level of DBP.

A (attitude): having a positive mind and exercising regularly. Exercising reduce the level of DBP.

### Table 4.20. Model Summary DBP

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.414</td>
<td>0.172</td>
<td>0.108</td>
<td>15.524</td>
</tr>
<tr>
<td>2</td>
<td>0.488</td>
<td>0.238</td>
<td>0.143</td>
<td>15.213</td>
</tr>
<tr>
<td>3</td>
<td>0.570</td>
<td>0.325</td>
<td>0.212</td>
<td>14.589</td>
</tr>
<tr>
<td>4</td>
<td>0.597</td>
<td>0.356</td>
<td>0.213</td>
<td>14.580</td>
</tr>
<tr>
<td>5</td>
<td>0.609</td>
<td>0.371</td>
<td>0.206</td>
<td>14.649</td>
</tr>
</tbody>
</table>
CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.0. Discussion

5.1.1. Demographics

The prevalence of HTN was higher in females than males and increased with age. From literature, gender can distinguish the levels of and explain variations in HTN. Carretero and Oparil (2000) observed that HTN is more prevalent in men albeit the differences narrowed by menopause and in those of low socioeconomic status. Furthermore the level of awareness also differs across gender: for example Cutler et al (2003) found out that among all of the race/ethnic groups, women continued to have somewhat better awareness, treatment, and control.

Literature reports that there are a number of individual patient characteristics like age, obesity and physical inactivity that are associated with uncontrolled HTN. For example Hyman and Pavlik (2001) reports that advanced age explains about 32% of uncontrolled HTN. Looking at age and the level of HTN, the study revealed that the highest incidences of uncontrolled HTN are in the older age groups 61-70 and the above 70 years age groups which combined represents 53.1%. It can therefore be concluded that age most sturdily explains levels SBP in support of the findings in Franklin et al, (2001) where aged accounted for majority of cases of uncontrolled HTN in individuals over the age of 60.

HTN is highly prevalent in the elderly. Several epidemiological surveys conducted in the USA and Europe concludes that HTN prevalence in the elderly ranges between 53% and 72% which was the same as found in this study. The proportion of diabetic, hypertensive patients of 28% was the same as that found by Basil et al has been 20% to 25% as diabetes is the most prevalent co-morbidity in HTN.
The size of the body can put the individual at risk of chronic diseases. One such measurement of body size is the waist circumference. If in men the circumference is above 102cm, the individual is considered to be at risk, likewise for a female a circumference of more than 89 cm puts her at risk. Fewer males are at risk (37% of males) based on waist size compared to females (77.1% of females) this could be due to contraceptives use which causes water retention. There are slight differences of BP levels across the BM index. Overweight cannot explain HTN among patients in Zimbabwe. Although more females were overweight/ obese than males, the association of obesity and HTN is very weak, in line with Mufunda et al (2006).

In line with international reports, level of education, and therefore literacy, among Zimbabweans is very high. Majority (61.6%) of the respondents have at least secondary school (secondary or tertiary). Also, given the economic woes bedevilling the Zimbabwean economy, around two-thirds of the patients are out of employment. The unemployment rate of about 70% mirror the national rate as put forward by various commentators and analysts. Literature correlates high educational level to better control of BP but in this study there was no significant correlation.

There was an association between diabetes patients and HTN levels which was negative like in Clement et al, (2012) and Solanki et al, (2013) because of the comorbidity itself. Corvol et al, (1999) reported that predisposition to primary (or essential) HTN is established by BP familial resemblance and the high level of concordance between monozygotic twins. In their study they found out that around 30% of individual BP variation is genetically determined. Some rare forms of HTN are monogenic, but the predisposition to essential HTN) is polygenic, (Corvol et al, 999). Among the genes implicated are those encoding for
angiotensinogen, alpha-adducin, or the angiotensin II AT$_1$ receptor. In this sample, about 60% of the patients come from a family with someone with HBP.

### 5.1.2. Hypertension status

In this study only 43% had their SBP under control this can be because compliance with drugs is an innate problem in the treatment of chronic asymptomatic conditions. This is one major reason Luscher et al, (1985) highlighted as the cause of ineffective treatment of HBP with drugs. Such a high number of people with uncontrolled BP could be that physicians do not treat HTN more aggressively as they are willing to accept an elevated systolic BP in their patients. Furthermore this study reveals that most patients have switched between drugs citing ineffectiveness of some drugs in containing their condition at acceptable levels.

Measurement errors cannot be ruled out of the fight to properly control HTN condition. Variations in HTN levels within patient have the potential to lead to misclassification of HTN status that may result in an overestimation of uncontrolled HTN. This risk may be reduced by taking a number of BP measurements, often on different occasions. In literature, for example Mesissner et al (1999) and Alenxander et al (1999) report that the distribution of the measurements is approximately normal-Rochester Epidemiology Project found that HTN rates did not vary based on the number of measurements considered. Multiple BP measurements is touted as the best method to take into account the influence of within-person variability because of physiological variation or measurement error, however numerous sources of non-random variation (for example white coat HTN) may still be present.

### 5.1.3. Pattern of use of hypertension Drugs

Almost all prescriptions from government were valid for three months but from private almost no repeats. This forces the HBP patients to consult their doctors almost every month. Generally after embarking on high BP drug therapy, the patient is expected to consult with
doctors monthly until the BP goal is reached. When the condition is under control, they can then continue with consultations with their doctors every three to six months.

The popular drugs were Hydrochlorothiazide followed by Nifedipine then Enalapril, furosemide, Atenolol, Losartan, amilodipine and Spinonaladome. This result is so because doctors were following the recommendation by JNC8. Townsend et al( 2011) found that the top three dispensed antihypertensive drug classes were beta blockers, diuretics, and angiotensin-converting enzyme inhibitors which is the same in this study. Combination of drugs is common and to some extent touted as best in HTN therapy, for example, Nelluri and Jampani, (2014) identified a significant reduction in systolic and DBP among patients on combination therapy compared to those on mono therapy. The drugs that were mainly prescribed included Hydrochlorothiazide (58%), Losartan (38%), Amlodipine (34%), Nifedipine (32%), Enalapril (30%) and Atenolol (30%). Poly-pharmacy is dominant as HTN is associated with numerous comorbidities and complications, with combination therapy seemingly a rational approach to curtail cardiovascular mortality (Mancia et al, 2007).

In contrast Solanki et al (2013) reports that the antihypertensive drugs most used are (respectively): enalapril (ACE inhibitor), (79.66%), atenolol (beta blocker) (49.66%), amlodipine (CCB) (33.83%), furosemide (loop diuretic) (17%) and metoprolol (Beta blocker) (4.66%). Solanki et al findings resonate with those from a study by Sandozi and Emani (2010). The variations in the prescriptions can be explained by medical professionals’ preference, patients’ unique characteristics, presence of other diseases, and availability of the medicines (Solanki et al, 2013).HCT, Enalapril and Nifedipine were equally popular among patients with long duration with HTN. HCT was popular among all other types across durations. Atenolol and frusemide were found mainly among patients with short durations, with frusemide being non-existent among patients with more than 30 years after diagnosis.
In this study only 9% of the patients had contraindicated combination. Various factors may be used to explain doctors’ lack of adherence to practice guidelines for HTN. These include knowledge deficits, disagreement with guidelines and reluctance to make therapeutic changes, a behaviour called clinical inertia. The combination included ACEIs and ARBs as well as beta blockers and CCB.

5.1.4. Commonly suspected adverse effects

In literature Solanki et al, (2013) found that enalapril was the most commonly prescribed antihypertensive drug, with 15.83% from the total of 600 patients developing side effects. Merely a fifth (19.3%) has experienced problems with their medicines. For this Zimbabwean case, we found out that the most common side effects were headache, dizziness, followed by sexual dysfunction and swelling of legs. Furthermore, Solanki et al (2013) identified that enalapril was responsible for about half of the side effects (50.52%) followed by amlodipine (25.26%) and furosemide (25.26%). In this study the major culprits for adverse effects was HCT, Nifedipine and atenolol.

The good part with asking patients themselves about problems with medication is that they remember all troublesome reactions with dissatisfaction compared to health practitioners like doctors, nurses and pharmacist. Ambrosioni et al (2000) for Italy observed that doctors recorded side effects in between 10 and 20% of their patients according to the drug administered this were almost the same with this study’s findings.

5.1.5. Drug compliance

Patients are taking medicines as recommended, with about 77% doing so. This is a significant adherence rate. However; literature informed that there are a number of patient characteristics like age. Ren et al, (2002) asserts that younger patients have been reported to have decreased
compliance and decreased persistence (Degli et al, 2002). In this study there is a strong association between age and taking medicines regularly as prescribed (taking medication: persistence). On the contrary no significant relationship exists between persistence and established HTN patients (duration) as was found in Degli et al, (2002). This implies that established patients have not passed the stages of lack of belief in their HTN diagnosis. This may be attributable to limited educational programmes. This high self-reported compliance with treatment as patients claimed to be taking their medication as prescribed can also be explained by the hypothesis tested in Mukora-Mutseyekwa and Chadambuka (2013) that patients know very well that non-adherence is a negative behaviour for which they can be reprimanded of therefore in an interview setting, non-adherent patients may be tempted to respond untruthfully.

Among the sample patients around 80% continue taking their medicine even if they feel their condition is under control. Osamor and Owumi (2011) reported that 11% of the respondents who were non-compliant to medication felt better and, therefore, had no need to continue taking their medication. The 20% who are non-adherent in this study are no surprise in the perspective of a dysfunctional health system in the country, marred by numerous challenges including acute shortage of workforce and large pool of patients. Assuring, is the better level of understanding among Zimbabwean patients compare to those in Nigeria for example, For Nigeria, Familoni et al., (2004) found out that those who were knowledgeable about HTN on that it should be treated for life were just about one-third of patients only, while a majority (58.3%) surprisingly thought that antihypertensive drugs need to be taken only when ‘symptoms’ are present and the remainder 6.3% considered the treatment period long, but certainly not for life.
If the respondents’ problems are forgetting to take medication and side-effects of treatment, they were unlikely to comply with treatment. In this study, those who have missed taking drugs it is mainly because they had forgotten or they lack money to purchase the medicine. The reasons for non-compliance found in this study were almost the same with those found by Busari et al (2010) which included less knowledge about the disease and obliviousness on the need for long-term treatment, exorbitant drug costs, religious practices and cultural beliefs, side effects, limited access to medical care and use of paired medications.

5.1.6. Knowledge, attitude and practices

The level of knowledge was minimal. This is so because HBP is a trivialised condition and health professionals do not take their time to educate patients. Little attention is given noncommunicable diseases such HTN probably due to the heavy burden from infectious diseases such as Cholera, Malaria and HIV/ AIDS (Khosravi et al. 2006). As such much effort is put on health education on communicable diseases and very little effort is put on informing the public about the non-communicable diseases. The results in this study are almost the same with those obtained by in Tanzania. In Tanzania 70% did not know a single risk factor of HTN whilst in UK in the same study all could at least mention one risk factor of HTN.

Patients had a negative attitude about the condition and the drugs because of the comments they made such as why taking medicine everyday if it cannot cure, too many side effects, take medicines every day is boring, they cause general body malaise, the medicines causes you to be sick, the condition is difficult to control, taking medicines everyday will kill me, supply medicines in liquid form, spent a lot of money on drugs, pained by taking medication for the rest of my life, medicines take away my sexual desire and I hope to stop these drugs. This is so because of lack of knowledge about the condition and the drugs. This is in line with Aubert et al (2006) findings that patients who are fully aware show positive attitude towards the treatment and management of the condition.
The practice of people with HTN in this study was a mixed bag 40% stopping taking their medication at some point in time, almost 18% using herbs on addition to pharmacotherapy, 77% taking their medication as prescribed, only 11% had BP measuring machines, 23% doing physical exercising, 38% claimed to be following dietary approaches to stop HBP and 60% were doing nothing to prevent complications of HTN except taking medications.

Sabouhi et al., (2011) concluded that hypertensive patients believe that the condition is not severe and significant, and the drugs results in many adverse reactions to warrant taking only when condition is out of ocntroll and when the symptoms appear and are persist.

5.1.7. Drug accessibility

Private pharmacies were the major source of anti-hypertensive drugs. The fiscal challenges faced by the country have limited the role of government in adequately supplying free medication for a number of chronic conditions- the social wage bill has been slashed significantly. In this study persons without health insurance had lower rates of BP control as was also found in 2005–2008 (National Centre for Chronic Disease Prevention and Health Promotion in 2011). This is so because those on medical insurance can always purchase their medicines whether they have money or not. Only HCT was available at government institutions.

Assuring is the fact that majority of the patients have not been hospitalised due to illness related to HTN. This could because the effects of uncontrollable HBP are not instant but are progressive, because as the prevalence and poorer control of HTN persist, majority of people are susceptible to cardiovascular setbacks such as CHD and stroke. Ekwunife, Okafor, Ezenduka, and Udeogaranya, (2013) noted that such cardiovascular attacks present a surmountable economic burden on a country given the high costs to manage them.
5.1.8. Regression Model

Finally a regression analysis was done in a hierarchical framework with the dependent variable taking two forms: systolic BP and diastolic BP. The model fails to explain sufficiently systolic BP (SBP) with two factors diabetes under demographics and knowledge of the condition being significant in explaining the levels of SBP. Someone who is diabetes is likely to have higher SBP; however those who are fully aware of their condition are able to reduce their SBP level. On the other hand, the hierarchical model explains 37.1% (adjusted 21%) of the variations in diastolic BP (DBP) with key factors coming from:

- **D** (demographics): with the following three factors increasing DBP in patients: BMI, alcohol taking and diabetes.
- **C** (compliance factors): taking medicines at recommended times; taking medication approximately the same time and taking medicines even BP under control. All these reduce the level of DBP.
- **A** (attitude): having a positive mind and exercising regularly. Exercising reduce the level of DBP.

The regression model fell to fully explain the control of HBP because in some cases the participants were not saying the truth for example where someone had an extremely HBP but claimed that they were adherent, persistent, they have never failed to purchase medicines and that the medicine was always available.

5.1.9. Hypothesis testing

Given the results presented and discussion above the study fail to reject the null hypothesis the study sought to test that: the current chronic therapy practices in management of HTN are not adequate for HTN control in Zimbabwe. The chi-square tests between therapy and systolic HTN blood pressure was insiginificant while only significant with DBP however with weak power of only 15% based on Phi and Cramer V’s tests. A number of measures
implemented are failing to contain BP at required levels and numerous practices are not significant in explaining levels of HTN among patients. Majority of the patients still believe there is need for adequate health education related to the management of HTN condition in Zimbabwe. For example if the patients still feel comfortable in stopping medication when he/she thinks BP is under control, then it reflects that there is still some huge knowledge gaps. There are several side effects witnessed most coming from drugs commonly prescribed in Zimbabwe. The tests were conducted at 5 % significant level; therefore the study fails to reject the null hypothesis at 95% confidence level.

5.20. Conclusions
The overall conclusion is that current treatment practices to manage hypertension are not adequately controlling the condition in those affected. Interventions like programmes to encourage healthy life style, provision/supply of various drugs, patient education, counselling services and a national chronic diseases management policy are required to improve hypertension pharmacotherapy.

5.2.1. The pattern of use of anti-hypertensive drugs
The results indicate that current prescribing patterns are in keeping with the recommendations of JNC-8 and our EDLIZ needs to be reviewed. There was minimal malpractice as far as drug utilisation is concerned. HCT, nifedipine, Enalapril, frusemede, atenolol, losortan, amilodipine spinorolactone are the popular drugs in that order among HTN patients in Zimbabwe. HCT, Enalapril and Nifedipine are equally popular among patients with long duration with HTN. However HCT is popular above all other types across durations. Atenolol and frusamide are found mainly among patients with short durations. In this study a significant HTN control was found among patients on combination therapy. All diabetic patients were on combination therapy. The greater incidences of HTN out of control imply that some cardiovascular attacks can be reduced by better BP control.
Rational utilisation of antihypertensive drugs was observed but the continued use of Atenolol for control of HTN leaves a lot to be desired. In the private sector patients are given monthly prescription which increases the cost of treatment of the condition.

5.2.2. The commonly suspected adverse effects

The most common side effects were headaches, dizziness, swelling of legs and sexual dysfunction. The observed side effects were the same as documented in literature as suspected of the individual drugs. With so many people on HCT sitting a lot of side effects including serious side effects like sexual dysfunction it will be important to have chlorthalidone registered on the Zimbabwean market as a single drug such that those not tolerating HCT can use chlorthalidone if they can afford it. Anti-hypertensive drugs were generally safe.

5.2.3. The extent to which patients are compliant with drug therapy

Often non-adherence to drug therapy is caused by high costs and the nature of the condition. The major causes of non-compliance were adverse effects and accessibility of the drugs. Unfortunately, majority of the BP patients still have little knowledge of their condition which contributes to high levels of non-compliance with medications. The level of compliance was below average and a lot needs to be done to improve compliance among hypertensive people in Zimbabwe.

5.2.4. Knowledge, attitude and practice about hypertension and drug therapy

This study concludes that a significant proportion of hypertensive patients have poor knowledge about HTN pharmacotherapy. The role of sufficient and effective patient education needs no emphasis. Ability and willingness of the patient to change and maintain some specific behaviour is key to the success of HTN management programmes. Patients were having a negative attitude towards HTN pharmacotherapy. The current practices by
HTN patients are not proper for HTN control. Stress, hereditary and pregnancy were the causes of HTN. Women had better awareness and BP control.

5.2.5. Drug accessibility
Access to an uninterrupted and affordable drug supply is mandatory for HTN control. On average the patients were not affording their drugs because most of them were unemployed and did not have medical insurance. Availability was at reasonable levels at private pharmacies but at government institutions availability was pathetic with only HCT in stock. Private pharmacies are playing a significant role in distribution of HTN drugs in Harare.

5.3. Recommendations
Based on the findings from the study, the following recommendations are provided:

a. Programmes to encourage better lifestyle: It would be proper to initiate programmes that inform the populace about dangers of bad life styles. For the greater portion of the population to adopt healthy lifestyles there is need for relevant public policies, which entails development of more facilities and opportunities for the public to engage in leisure physical exercise enhanced food labelling and promotion of healthy diet. As majority of the patients reported that they do not have knowledge on health issues there is need for the promotion of healthy diets into policy. Local food manufacturers should comply with international salt and fat content of packed foods. Companies should be encouraged to have sports clubs with well equipment gym facilities.

b. Provision/ supply of various drugs: The government can play a significant role in improving access through funding, providing an enabling environment by making importation easy or by being an active supplier through finding of National pharmaceutical Company (Natpharm). All stakeholders in the health sector should provide an uninterrupted appropriate and affordable treatment supply. It could be a noble idea for one of the private
pharmaceutical wholesalers to start the registration procedures for chlorthalidone. There is need for a chronic disease policy which should ensure accessibility of chronic drugs and compel organisations like Medicines Control Authority of Zimbabwe to fast track registration of chronic medicines and a more liberal section 75 for chronic medicines to ensure that they are always available. Medical aid societies should come up with affordable medical insurance for chronic unemployed people and reach out to them through advertising.

**c. Educating the populace:** educational campaigns should be contacted country wide to the whole population to increase awareness and treatment of HTN. People need to understand the dangers of stopping medication, know more on proper management of HTN. More campaigns aired also on radio and television as well as work places will act as a constant reminder to patients to take up their medicines. Related campaigns are done for HIV/ Aids, and HTN requires just the same attention and publicity.

At risk population groups for example those with family history of HTN, females and adults over the age of sixty years should be encouraged to have more regular BP checks. Posters which encourage losing weight, dietary approaches to stop HTN and physical activities should be used to convey the information. The public and patients alike desire educational programs on risk factors and complications of the chronic condition. This can be provided by the Ministry of Health as well as the various forms of media (print and electronic) can run programmes informing the public. The corporate world should chip in public education by sponsoring such programmes. Within government hospitals a specialised unit in the out-patient department can be established to run awareness campaigns and provide moral support.

**d. Counselling services:** Psychological examinations and therapy is frowned upon among black communities. However, this needs to change given the high stress levels and the subsequent effect on individual health. Therefore campaigns to encourage uptake of these services and educating everyone about the benefits of obtaining such services should be embarked on, mainly form the Ministry of Health and Child Welfare. Due to the long term
nature of the condition social networks becomes as there is need for radical and life-long change in the lifestyle of the affected person.

e. National health plan: The socio-economic challenges in Zimbabwe are making it increasing difficulty to manage chronic conditions like HTN due to lack of funds for medication as well as poor life styles. Government support of accessing health facilities should be prioritised, possibly with the formation of a national health scheme given that most people are unemployed or are underpaid and therefore cannot afford buying medicines. It has been observed that majority of patients purchase drugs monthly using out of pocket source. This implies that on average individuals spend close to a dollar per day of anti-hypertensive drugs, yet an average household is living on less than a dollar a day. Health insurance remains out of reach for most HBP patients and most of them pay out-of-pocket for their health expenses. There is need for innovative ways of financing care for people with HTN. There is need for developing national HTN guidelines aiming at improving the rates of awareness, treatment and control of HTN. A review of EDLIZ is now overdue and the researcher suggest the avoidance of use of atenolol for for management of HTN only, thus in patients with no other co-morbidity.

f. Health Professions: A multidisciplinary team of health professionals could be very effective in improving HBP. According to Walsh et al (2006) patients being managed by a physician and a pharmacist had lower BP levels, and were more likely to reach their target BP than patients treated by a physician alone. The health professionals play a key role in educating the patience on risk factors and complications of the condition; therefore they need to spend more time with the patients. For example, pharmacists are well positioned to better assist patients with lifestyle modification in the context of pharmaceutical care. This is so because pharmacists have a wide knowledge about the principles of drug therapy, use of medicines and prevention. In the process and due to the close contact with patients, the
pharmacists can identify drug therapy related problems and recommend possible solutions including referrals to the general practitioner. Pharmacists can monitor therapeutic outcomes of HTN management.

Due to the uniqueness of each patient there is need for patient-centred approach through which barriers to compliance can be identified and personalised self-management plan can be established. The key is a good doctor–patient relationship, coupled with regular education about the condition and possible side-effects, and the complexity as well as cost of treatment. There is need for convenient appointments and match the treatment regimen to the particular patient's lifestyle and needs. The rationale for making a particular selection when initiating antihypertensive therapy should be evidence-based and clinically impartial. Doctors should where possible stick to the three to six months valid prescription to reduce cost of treatment of HTN where BP goal has been reached.

5.4. Limitations of the Study
The major limitation to this study is the inability of the researcher to fully include other methods as recommended by modern research methods to use mixed method to cancel negative methodology effects of each method. There is a general constraint on the maximum number of questions that any questionnaire can contain if the helpfulness of the participant is not to be assumed on too much.

5.5 Areas of further study
Studies can be done to design tailored chronic care models which is different from management of acute conditions. Focus group discussion can be held to establish the status of chronic therapy of HTN since this study only utilise mainly quantitative methods.
REFERENCES


Akl OA, Khairy AM, MAbdel-Aal N, Deghedi BS, Amer ZF. Knowledge, Attitude, Practice and Performance of Family Physicians Concerning Holistic Management of Hypertension J Egypt Public Health Assoc2006 Vol. 81 No. 5 & 6,


Benson J,& Britten N. Patients’ decisions about whether or not to take antihypertensive drugs: qualitative study. Br Med J. 2002;325:873


Familoni BO, Ogun SA, Aina AO. Knowledge and awareness of hypertension among patients with systemic hypertension. *JAMA*. 2004;96:620–


Heart Foundation Guide to management of hypertension 2008


Shaikh MA,Yakta D,Kumar R(2012) Hypertension Knowledge, Attitude and Practice in Adult Hypertensive Patients at LUMHS JLUMHS MAY-AUGUST 2012; Vol 11: No. 02


Taylor AA, Shoheiber O. Adherence to antihypertensive therapy with fixed-dose amlodipine besylate/ benazepril HCl versus comparable component-based therapy. Congest Heart Fail. 2003;9: 324–332


Whitworth JA, World Health Organization, International Society of Hypertension Writing Group 2003 World Health Organization (WHO)/International Society of


WHO, (2014) Global Health Observatory (GHO) Raised blood pressure Situation and trends


APPENDICES

A. QUESTIONNAIRE FOR INDIVIDUALS WITH CHRONIC HYPERTENSION.

A. DEMOGRAPHICS

1. Male □ Female □ Age □

Employed: Yes □ No □ BP □ Mass/height □ BMI □

Smoking: Yes □ No □ Ex-smoker Yes □ No □

Alcohol consumption: Yes □ No □ Ex alcohol consumer Yes □ NO □

Waist measurement □

Diabetes □ Any other diseases………………………………………………

Does anyone in your family have HBP? Yes □ No □

When were you diagnosed of hypertension? …………………… Unsure □

Educational levels: Primary □ Secondary □ Tertiary □

Occupation……………………………………………………………………

B. DRUG UTILISATION AND PHARMACOEPIDEMIOLOGY

2. Medicines (all) How often? When? (morning, before/after meal, etc…)

(i)………………… ……………… ………………………………………

(ii)………………… ……………… ………………………………………

(iii)………………… ……………… ………………………………………

(iv)………………… ……………… ………………………………………

(v)………………… ……………… ………………………………………

3. How long have you been taking HBP medicines?……………………………………

4. Repeat prescription Yes □ No □

5. What is the status of your condition?

Not under control □ moderately under control □ well controlled □

6. Have you ever been hospitalised because of hypertension? Yes □ No □

7a. Have you ever had your medicines changed? Yes □ No □

7b. What were the reasons for changing?………………………………………………

8. Is the medication you are taking giving you any problems? Yes □ No □

9. What are the problems?………………………………………………………………

C. MEDICATION COMPLIANCE

10. How often do you take your antihypertensive medication exactly as recommended?
11. How often do you find it inconvenient or difficult to take your medicines exactly as recommended?

Never ☐ Sometimes ☐ Always ☐

12. Do you take your medicines always at the same time? Yes ☐ No ☐

13. Do you associate the taking of your medicine with your daily activities? Yes ☐ No ☐

14. Do you take your medicines when you know that your BP is under control? Yes ☐ No ☐

15. When will you buy your next supply of medicines? …………………………………………………

16. Have you ever stopped taking any of the medicines or failed to take your medicines?

Yes ☐ No ☐

17. Which of the following reasons has contributed most to your not taking your medicines?

1. Forgetting to take the medicines ☐
2. Side effects ☐
3. Complexity of the therapeutic regimens ☐
4. Lack of money to purchase the medicines ☐
5. Unavailability of the medicines ☐
6. Other reasons ……………………………………………

18. What do you think should be done to improve adherence to medicine taking? …………………

……………………………………………………………………………………………………………………………………

D. KNOWLEDGE, ATTITUDE AND PRACTICE

19. Other than taking medicines, do you do something else to control your HBP?

Yes ☐ No ☐

20. What else do you do to control your blood pressure?

Stress management ☐ Low fat diet ☐ High vegetable diet ☐
Reduce Na daily intake ☐ Regular physical activity ☐ other…………………………..

21. How strict do you follow Dietary Approaches to Stop Hypertension?


22. How often do you exercise? Never ☐ Sometimes ☐ Always ☐

23. What do you think should be done so that people eat according to Dietary Approaches to Stop Hypertension and do some exercises? ……………………………………………………………………………………………………………………………

……………………………………………………………………………………………………………………………………

24. Do you take any herbal medicines? Yes ☐ No ☐ If Yes, please specify……………………………..

25. Do you have a BP machine at home? Yes ☐ No ☐

26. What range of BP are said to be good or acceptable? Don’t know ☐ Knows ☐
27. What do you think caused you to have hypertension? .................................................................

28. What symptoms do you expect to see when your BP is high? ......................................................

29. What symptoms do you expect to see when your BP is very low? ...................................................

30. What do you think should be done to make people know their medicines and condition?
............................................................................................................................................................

31. Is hypertension curable? Yes ☐ No ☐

32. Which health professional often helps you in the management of your BP?
Pharmacist ☐ Doctor ☐ Nurse ☐ Other (please specify) .................................

33. How often do you visit your doctor?
Every 1month ☐ 3month ☐ 6month ☐ 12month ☐ other (please specify) ............... 

34a. Does anyone help you in the management of your condition? Yes ☐ No ☐

34b. Who support you in the management of your HBP? .................................................................

35. What are the risk factors of hypertension?

   a) Excessive salt intake ☐
   b) Excessive alcohol ☐ intake
   c) Physical inactivity ☐
   d) Obesity ☐
   e) Smoking ☐
   f) Stress ☐
   g) I don’t know ☐
   h) Others (Explain) .............................................................................................................................

36. What are the complications which a Hypertensive can develop?

   a) Cardiac Hypertrophy with heart failure ☐
   b) Heart Attack ☐
   c) Stroke ☐
   d) Eye Problems ☐
   e) Renal Problems ☐
   f) I don’t know ☐

37. How do you avoid the complications of Hypertension?

   a) Reduce salt intake ☐
   b) Reduce/Stop alcohol intake ☐
   c) Doing exercise ☐
d) Reducing weight  

e) Reduce/Stop smoking  

f) Taking regular medication  

g) I don’t do anything  

h) Others  
(Explain)  

38. What other facts do you know about hypertension?  

39. Where do you get information about hypertension?  

40. What worries you most after you diagnosed with Hypertension?  

- Fear of death  
- Fear of other related diseases e.g. Heart attack  
- Cost of treatment  
- Side effects of medication  
- Other  

41. Is hypertension a serious condition?  
Yes  No  

E. MEDICINES ACCESSIBILITY  

42. How do you pay for your medicines?  
Cash  Medical aid  Social welfare  other (please specify)  

43. If using cash how much do you spend per month?  

44. Who pays for your medicines?  

45. Do you sometimes fail to purchase medicines?  
Yes  No  
If YES state the reasons for failing to purchase medicines  

46. What do you think should be done to improve affordability?  

47. Do you sometimes fail to get your medicine because it will not be available?  
Yes  No  

48. Where do you often get your medicines?  
Private pharmacies  Clinics  Central hospitals  Other (please specify)  

49. What do you think should be done to improve availability?  

50. Would you like to say something about hypertension medicines?  

END OF QUESTIONNAIRE  

THANK YOU
**B. IPHEPHA LEMIBUZO MAYELANA LABANTU ABALE BP.**

### **A. UKUBALWA KWABANTU**

1. Isilisa [ ] Isifazana [ ] Ubudala [ ]

   Uqatshiwe: Yebo [ ] Hatshi [ ] BP [ ] Ubunzima/ubude [ ] BMI [ ]

   Uyabhema: Yebo [ ] Hatshi [ ] Wawubhema Yebo [ ] Hatshi [ ]

   Uyanatha utshwala: Yebo [ ] Hatshi [ ] Wawunatha: Yebo [ ] Hatshi [ ]

   Ubukhulu bokhalo lwakho [ ]

   Umkhuhlane wetshukela [ ] Ingabakhona eminye imikhuhlane………………………………………………

   **Ukhona na omunye emulini yakini ole BP?** Yebo [ ] Hatshi [ ]

   **Kwabonakala nini ukuthi ule BP?** …………………………. Angilaqiniso [ ]

   Ibanga lemfundo owafika kulo: Iphurayimari [ ] Isenhondi [ ] Ekolitshini [ ]

   Umsebenzi owenzayo………………………………………………

### **B. UKUSETSHENZISWA KWEMITHI LEMIKHUHLANE EKUMPHAKATHI**

2. **Imithi (yonke)**
   (i)……………………………………

   (ii)……………………………………

   (iii)……………………………………

   (iv)……………………………………

   (v)……………………………………

3. Ulesikhathi esinganani unatha imithi ye BP?.............................................

4. Ubhalelwa iphepha lokuthenga kanengi imithi ungabuyelanga kudokotela? Yebo [ ] Hatshi [ ]

5. Isimo sakho sinjani khathesi?
   Kasikalawuleki [ ] Siphakathi laphathathi kokulawuleka [ ] Silawuleka kuhle [ ]

6. Sewake walaliswa esibhedlela ngenxa yeBP? Yebo [ ] Hatshi [ ]

7a. Imithi yakho seyake yantshintshwa na? Yebo [ ] Hatshi [ ]

7b. Kwakuyini izizatho zokuntshintsha?................................................................................

8. Umuthi owunathayo uyakuhlupha na? Yebo [ ] Hatshi [ ]

9. Luhlupho bani?…………………………………………………………

### **C. UKUNATHA IMITHI NGENDLELA EFANELEYO**

10. Kukangaki lapha onatha khona imithi yakho ngesikhathi esiyiso sibili okumele uynathe ngaso?

   Angizake [ ] Kwesinye isikhathi [ ] Nsukuzonke [ ]
11. Kukangaki lapha okuthola kukukhathaza kumbe kunzima ukuthi unathe imithi yakho ngesikhathi okuyiso sibili ocetshiswe ukuthi uyinathe ngaso?
Angikaze  
Kwesinye isikhathi  
Nsukuzonke

12. Unatha imithi yakho ngasikhathi sinye zonke insuku na? Yebo  
Hatshi

13. Ukunatha imithi yakho ukufanisa lemisebenzi yakho yansuku zonke na? Yebo  
Hatshi

14. Uyayinatha na imithi yakho lapha usazi ukuthi iBP yakho ilawuleke kuhle? Yebo  
Hatshi

15. Uzathenga nini imithi yakho eyesikhathi esizayo? .................................................................

16. 19. Sewake wema ukunatha eminye yemithi kumbe wehluleka ukunatha imithi yakho na?
Yebo  
Hatshi

17. Yiziphi izizatho kulezi ezilandelayo ezibangele kakhusi ukuthi ungathwa imithi yakho?
1. Ukukhohlwa ukunatha imithi
2. Okubi okubangwa yimithi
3. Ukungazwisiseki kwendlela zokwelatsha
4. Ukuswela imali yokuthenga imithi
5. Ukusweleka kwemithi
6. Ezinye izizatho.................................................................

18. Ucabanga ukuthi kuyini okumele kwenziwe ukuze kwenziwe kubengcono okulandela ukunathwa kwemithi ngezikhathi ezifaneleyo?..........................
..........................................................................................................................................................

D. U LWAZI, UKUKHANGELWA KWAKHO LENQUBO

19. Ngaphandle kokunatha imithi, kukhona yini okunye okwenzayo ukulawula iBP yakho?
Yebo  
Hatshi

20. Kuyini okunye okwenzayo ukulawula iBP yakho?

Ukulawula ukukhathazeka kwengqondo  
Ukudla okulamafutha amalutshwane  
Ukudla okulembihida eminengi

Ehlisa inani le Na olidlayo  
Hlala uhambahambisa umzimba  
Okunye…………………….............

21. Ulandela ngendlela eqine kanganani izindlela zokudla ukudla okulungele umzimba wakho ukwenzela ukuqeda iBP?
1. Angikaze  
2. Kwesinye isikhathi  
3. Ngikulandela kakhusi

22. Uqinisa kakhusi umzimba wakhe? Angikaze  
Kwesinye isikhathi  
Nsukuzonke

23. Ucabanga ukuthi kuyini okumele kwenziwe ukwenzela ukuthi badle ukudla belandela indlela eyenza ukuthi baqede iBP kanye lokuthi bahlale beqinisa imizimba yabo?.................................................................
..........................................................................................................................................................

106
24. Zikhona yini izihlahla eziyimuthi ozidlayo kumbe ozinathayo? Yebo □ Hatshi □ Uma uthe Yebo, akuziqambe........................................

25. Ulomtshina wokuhlola iBP ngekhaya na? Yebo □ Hatshi □

26. YiBP esuka kuliphi ibanga ifika kuliphi okuthiwa ilungile kumbe iyemukeleka? Angazi □ Ngiyazi □

27. Ucabaga ukuthi kuyini okwakwenza waba leBP?.................................................................

28. Yizibonakaliso bani okhangelele ukuthi uzibone lapha iBP yakho iphezulu?

29. Yizibonakaliso bani okhangelele ukuthi uzibone lapha iBP yakho yehlile iphansi kakhulu?

30. Ucabanga ukuthi kuyini okumele kwenziwe ukwenzela ukuthi abantu bazi ngemithi yabo langesimo sabo?

31. I-BP iyelapheka na? Yebo □ Hatshi □

32. Yisiphi isazi sezempilakahle esijwayele ukukuphathisa ekulawuleni iBP yakho?

33. Uya kangaki kudokotela wakho?

34a. Ukhona yini okuphathisayo ekulawuleni isimo sakho? Yebo □ Hatshi □

34b. Ngobani abakusekelayo ekulawuleni iBP yakho?.................................................................

35. Yiziphathu ezibangele iBP?

a) Ukudla isawudo elinengi khulka-khulu
b) Uknunatha utshwala kakhulu
c) Ukuhluza umzimba
d) Ukuzimuka kakhulu
e) Ubhema
f) Ukukhathazeka kwengqo
g) Angazi
h) Okunye (Chasisa).................................................................

36 Yiziphathu ezimbi ezingaqalisa ukubakhona emuntwini oleBP?

a) Ukukhula kwenhliziyo lokweluleka
b) Ukuma ukusebenza kwenhliziyo
c) Ukutshaywa yisitiroku
d) Ukuhlutshwa ngamehlo
37. Ungaceza njani okubi okubangwa yiBP?
   a) Ehlikisawudo olidlayo
   b) Ehlisha/Yekela ukunathathwa utshwala
   c) Qinisa umzimba
   d) Ehlisha ukuzimuka kwakho
   e) Ehlisha/Yekela ukubhema
   f) Ukunatha imithi ngezikhathi
   g) Akukho engikwenzayo
   h) Okunye

(Chasiswa)..........................................................................................................................

38. Kuyini okunye okwaziyo mayelana leBP?.............................................................................

39. Uluthola ngaphi ulwazi mayelana leBP?.............................................................................

40. Kuyini okukukhazazo kakhulu ngemva kokutholakala uleBP?
   Ukwasaba ukufa _______kwesaba eminye imikhuhlane e.g. ukuma kweni
   Indleko zokwelaza _______Okubi okubangwa yimithi
   Okunye.............................................................................................................................

41. Ukuba leBP ngumumo omubi kakhulu na? Yebo _______Hatshi _______

42. Uyibhadalela njani imithi yakho?
   Ngemali _______NgeMedical Aid _______Ngabenhlakahle _______Okunye
   (akukuqambe).........................

43. Uma usebenzisa imali, uchitha malini ngenyanga? .........................

44. Ngubani okuhadhalela imithi yakho? .................................................................................

45. Wawuke wehluleke ukuthenga imithi kxesinya isikhathi? Yebo _______Hatshi _______Uma uthe YEBO
tshono izizatho zokwela ukuthenga imithi...............................................................................

46. Ucabanga ukuthi kumele kwaziwo isikhathi ngobiza intengo yemithi?
   .................................................................................................................................

47. Wawuke wehluleke ukuthenga imithi yakho kxesinya isikhathi ngoba ingekho na?
   Yebo _______Hatshi _______

48. Ujwayele ukuyithola ngaphi imithi yakho?
Ezitolo zemithi ezizimele zodwa □ Ekliniti □ Ezibhedlela ezinkulu □ Kwezinye indawo (Akuziqambe) ..................

49. Ucabanga ukuthi kuyini okumele kwenziwe ukuze kwenziwe kubengcono ukutholakala kwemithi? .................................................................

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

50. Kukhona na ongathanda utsho mayelana lemithi yeBP? .........................

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

IPHELELA LAPHA IMIBUZO : NGIYABONGA

C.GWARO REIMIBVUNZO INOBVUNZWA MUNHU ANE BP INOKWIRA

A. RUMWE RUZIVO PAMUSORO PEMUNHU UYU

1 Muri mukadzi here kana murume? Murume □ Mukadzi □

Makore okuzvarwa □

Munosevenza here? Hongu □ Kwete □ BP □

Munorema zvakadi? □ BMI □

Munoputa fodya here? Hongu □ Kwete □

Maimboputa fodya here? Hongu □ Kwete □

Munonwa doro here?: Hongu □ Kwete □

Mune chirwere cheshuga here?

Mune zvimwe zvirwere here? ..........................................................

Mumhuri menyu mune vamwe vane BP here? Hongu □ Kwete □

Makaonekwa rini kuti mune BP? ......................... handinyatsozivi □

Dzidzo yamakagumira: Puramari □ Sekondari □ Dzidzo yepamusoro □

Munosevenza basa rei? .................................................................................................................................

B. MASHANDISIRWO EMAPIRITSI UYE MASHANDIRO AVO KUVAZHINJI VANOASHANDISA

2. Mishonga yamunomwa(yose zvayo) munonwa kangani? Munonwa nguva(mangwanani Musati madya/ Mapedza kudya here?, ……)

(i) ........................................ ..............................................................
3. Mave nenguva yakadii muchishandisa mapiritsi eBP?..........................

4. Kushandisazve mapiritsi amakagara matarirwa kare nadhokota. (kudzokorora pirisikipusheni)
   Hongu  Kwete

5. BP yenyu yakakwira zvakadii?
   1. yakakwira zvakanyanya 2. yakati kwirei 3. Iri pakanaka parizvino

6. Mati mambogara muchipatara here nepamusana peBP? Hongu Kwete

7a. Mati mambochinjirwa mapiritsi here? Hongu Kwete

7b. Chii chakakonzera kuti muchinjirwe mapiritsi? ..............................................................

8. Mapiritsi amuri kumwa anokupai dambudziko here? Hongu Kwete

9. Ndeapi matambudziko aya? .................................................................

C. KUTEVEDZA MIRAIRO YEMAMWIRWO EMAPIRITSI

10. Kangani kamu nonwa mapiritsi enyu eBP namazvo sokutarirwa kwamakaitwa?
    Handitombotori Dzimwe Nguva Nguva dzose.

11. Kangani kamunoona zvakakuomerai kana kuti zvingaiti kuti mumwe mapiritsi enyu sokutarirwa kwamakaitwa?
    Handitombotori Dzimwe Nguva Nguva dzose.

12. Munonwa mapiritsi ose panguva imwe here? Hongu Kwete

13. Munomwa mapiritsi mushure mezvimwe zviitiko zvezuva here? Hongu kwete

14. Munonwa mapiritsi enyu here kana BP isina kukwira? Hongu kwete

15. Muchatenga rini mimwe mishonga yenyu? ......................................................

16. Makamborega kumwa mapiritsi here kana kumbotadza kumwa mapiritsi?
    Hongu Kwete

17. Pazvikonzero zviri pasi apa ndezvipi zvakaita kuti mutadze kunwa mapiritsi?
1. Kukanganwa kumwa mapiritsi
2. Mamwe marwadzo anokonzerwa nemapiritsi
3. Kunetswa nekutevedza nguva dzekumwa mapiritsi
4. Kushaya mari yekutenga mapiritsi
5. Kushaika kwemapiritsi
6. Zvimwevo zvikonzero ..............................

18. Zvii zvingaitwe kuti mukwanise kunyatsotevedzera zvinodikanwa pakumwa mapiritsi?
.................................................................................................................................

D. RUZIVO RWENYU, MASHANDISIRO UYE MAONERO AMUNOITA NYAYA YOKUNWA MAPIRITSI.

19. Kunze kwekunwa mapiritsi mune zvimwe zvamunoita kuedza kuderedza BP yenyu?

Hongu [ ] Kwete [ ]

20. Ndezvipi zvimwe, pane zviri pasi apa, zvamunoita kuedza kuderedza BP yenyu?

1. kuderedza zvinhu zvinonetsa mupfungwa
2. Kusadya zvakanyanya mafuta
3. kudya kune miriwo yekurima yakasiyana-siyana
4. kuderedza kudya munyu
5. Kuita maekisaizi nguva nenguva
7. Zvimwewo .................................................................

21. Munotedzera zvakadii tsika yokuita madyiro anokurudzirwa pakuderedza BP?

Handishanduri madyiro [ ] Dzimwe nguva [ ] Nguva dzose [ ]

22. Munoiita maekisesaizi kakawanda zvakadii?

1. handiiti [ ] 2. ndinoita pano neapo [ ] 3. ndinoita kakawanda [ ]

23. Munofunga kuti zvii zvingaitwa kuti vanhu vateedzere madyiro okuderedza BP kana kuti vaite maekisesaizi?
24. Mune mimwe mishonga yamunomwa here isiri mapiritsi kuedza kudedza BP yenyu?
   Hongu □□ Kwete □□

Kana iripo ndeipi mishonga iyi? .................................................................

25. Mune mushini wokuyera BP kumba here?  Hongu □□ Kwete □□

26. Kuti BP inzi yakanaka inenge iri pakati penhamba dzipi?
   Handizivi □□ Ndinoziva inenge iri □□

27. Munofunga kuti chii chakakonzera kuti muve neBP? ................................................

28. Zvii zvamunonzwa kuti BP yenyu yakakwira? ........................................

29. Zvii zvamunonzwa kana BP yenyu yakadzika? ...........................................

30. Zvii zvingaitwe kuti vanhu vavedzere ruzivo rwavo rwezveBP uye mapiritsi nemishonga yavanotora? .......................................................... 31. BP
   inorapika here?  Hongu □□ Kwete □□

32. Ndevapi vashandi weutano vanokubatsirai mukuona kuti BP yenyu yakamira mushe?
   1. Weku Famasi □□  2. chiremba □□  3. mukoti □□
   4. vamwewo ..............................................................

33. Munoenda kundoona dhokota kakawanda zvakadii?
   pamwedzi □□ mwedzi 3 □□ mwedzi 6 □□ mwedzi 12 □□ zvimwewo……
   ...........................................................................

34a. Pane anokubatsirai here kuti muchengetedze BP yenyu iri pari nani?
   Hongu □□ Kwete □□

34b. Ndiani anokubatsirai kuti muchengetedze BP yenyu iri pari nani?.........................

35. Ndizvipi zvinokonzera BP?

a) kudya munyu vakawanda

b) kunwa doro rakawanda

c) kusaita maekisesaizi
d) kuita muviri wakakura zvakanyanyisa

e) kuputa fodya

f) kugara uchinetseka mupfungwa

g) handizivi

h) zvimwevo (tsanangurai) ...............................................................

36. BP inogona kuunza matambudziko api?

   a) kuzvimba kwemwoyo
   b) kugwamba kweropa mumwoyo
   c) kuoma mimwe mitezo yemuviri
   d) dambudziko remaziso/kutadza kuona
   e) kusashanda zvakanaka kweitsvo
   f) handizivi

37. Unoderedza sei matambudziko anounzwa neBP?

   a) kusadya munyu vakawandisa
   b) kuregera kunwa doro/ kunwa doro zvishoma
   c) kuita maekisesaizi
   d) kusaita muviri une mafuta akanyanya
   e) kushandisa mushonga waunenge wakatarirwa
   f) handina zvandinoita
   g) zvimwewo (tsanangudza)..........................................................

38. Mune rumwe ruzivo rwemuinaro pamusoro peBP?.............................................

39. Munowana kupi ruzivo pamusoro peBP?..................................................

40. Chii chakanyanya kukutyisai pamakaonekwa kuti muneBP?
Kutya kufa mamwe matambudziko anounzwa neBP (kurwara nemwoyo)

Kudhura kweurwere hweBP matambudziko anouya nemishonga yeBP

Zvimweso .................................................................

41. BP chirwere chinotyisa here?  Hongu  Kwete

E. KUWANIKWA KWEMAPIRITSI

42. Mapiritsi enyu eBP munoabhadhara sei?

1. kubhadhara keshi  2. Kubhadharirwa nemedhikari eidhi

3. Kubhadharirwa newerufeya

4. Dzimwewo nzira dzokubhadhara (Nyatsodoma)

43. Kana muchibhadhara mega (kubhadhara keshi) munoshandisa marii pamwedzi? ......................

44. Ndian anokubhadharirai kutenga mapiritsi? .............................................

45. Munombotadza kutenga mapairitsi here?

Hongu  Kwete

Kana muchimbotadza kutenga mapiritsi chii chinoita kuti mutadze kutenga mapiritsi aya?.................................

46. Chii chingaitwa kuti mutengo wemapiritsi uve uri nani?.................................

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

47. Munombotadza kuwana mapiritsi nokuti haasi kutombowanika zvachose here?

Hongu  Kwete

48. Mapiritsi enyu munowanzoavana kupi ?

1. kumaFamasi ari puraivheti  2. kuirinika  3. Kuzvipatara zvikuru

Kumwewo kwamunoawana (taurai kuti kupi chaiko).................................

49. Chii chingaitwa kuti mapiritsi ave nyore kuwanikwa?

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

50. Mune zvimwewo zvamungada kutaura pamusoro pemishonga yeBP?

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

GWARO REMIBVUNZO RAPERA PANO

NDATENDA
D. Informed Consent Letter

Title of Study: Patterns and Characteristics of Hypertension Pharmacotherapy in Zimbabwe.

Principal Investigator:
Name: Petmore Mudziwepasi
Department: Clinical Pharmacology
Address: College of Health Sciences, University of Zimbabwe
Phone: 0772996880
E-mail: petmoreword@yahoo.com

You are being invited to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to establish the current status of high blood pressure management in people that are using conventional medicines to control their high blood pressure. You were selected as a possible participant in this study because you have high blood pressure and you are using conventional medicines to control it. There are no anticipated risks or discomforts related to this research. There are no costs to you for participating in the study. The information you are going to provide will be used to establish the current status of high blood pressure and hopefully it will be used for improvement of high blood pressure management. The interview will take approximately five minutes. You may also find the interview to be very enjoyable and rewarding since you can get some information about hypertension management. This survey is anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study. Any information derived from your participation in the study will be kept confidential by the researcher. Your participation in this study is voluntary. By signing this letter you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer for any reason or to discontinue the interview. There is no monetary compensation to you for your participation in this study. If you have any questions about the study, please contact the above mentioned person. This project was approved by the Joint Research Ethical Committee (JREC) at Parirenyatwa Hospital/UZ College of Health Sciences, and the Medical Research Council of Zimbabwe (MRCZ). If you have any concerns about your rights in this study, please contact Joint Research Ethical Committee (JREC) at Parirenyatwa Hospital/UZ College of Health Sciences (mmchidzonga@medsch.uz.ac.zw (Imbuzi@medsch.uz.ac.zw +263 4 708140), and the Medical Research Council of Zimbabwe (MRCZ) (rcz@mrcz.org.zw +263 79 17 92 / 79 11 93).
By signing this consent form, I confirm that I have read and understood the information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

_________________________  _______________  ____________________
Name of Participant         Date                Signature

_________________________  _______________  ____________________
Name of Researcher          Date                Signature
E.Fsamba Yokubvuma Kupinda Mutsvagurudzo

Musoro Wetsvakurudzo: Ongororo yekuona mashandiro emishonga yechirungu kune vanhu vanogara mumaguta vane dambudziko reBP inokwira.

Mukuru Wetsvakurudzo:

Zita: Petmore Mudziwepasi
Dhipatimendi: Clinical Pharmacology
Adhiresi College of Health Sciences, University of Zimbabwe
Nhamba Yefoni: 0772996880
Adhiresi Yetsamba Dzenhare: petmoreword@yahoo.com


Chinangwa chetsvakurudzo ino ndechekuungorora marapirwo anoitwa vanhu vanenge vaine dambudziko reBP inokwira vanoshandisa mishonga yechehirungu. Masarudzwa kuti mupinde mutsvakurudzo ino pamusana pokuti mune BP inokwira uye muri kushandisa mishonga yechehirungu kudzikisa BP iyi. Hapana dambudziko ratinotarisira kuti mungasangana naro nokuti mapinda mutsvakurudzo ino. Hapana kana mari yamuchashandisa patsvakurudzo ino. Ruzivo rwenyu rwamuchatipwa ruchatibatsira pakuongorora madzikisirwo ari kuitwa BP uye tine tarisiro yokuti zvichatibatsira mukuvandudza madzikisiro eBP.

yamunopihwa kupinda mutsvakurudzo ino. Kana muine mimwe mibvunzo pamusoro petsvakurudzo ino munogona kutaura nemunhu ane zita rakanyorwa kwekutanga kwegwaro rino. Tsvagurudzo ino yakapihwa mvumo neavo vanoona nezvzekutwa kwetsvakurudzo nemazvo vanonzi Joint Research Ethical Committee yechipatara cheParirenyatwa nechikoro chezvoutano cheyunivhesiti yeZimbabwe. Yakapihwa zve mvumo nebazi rehurumende rinoona nezvetsvakurudzo dzezveutano muZimbabwe inonzi Medical Research Council of Zimbabwe(MRCZ). Kana muine zvimwe zvamungada kuziva pamusoro pekodzero dzenyu mutsvakurudzo ino makasununguka kubata vanomiririra mapazi aya panotevera: Joint Research Ethical Committee (JREC) vanowanikwa pa Chipatara che Parirenyatwa ne koreji yezveutano yeunivhesiti yeZimbabwe (mmchidzonga@medsch.uz.ac.zw (lmbuzi@medsch.uz.ac.zw +263 4 708140), pamwechete nevanoona nezvetsvakiridzo kudivi rezveutano muhurumende ve Medical Research Council of Zimbabwe (MRCZ).rcz@mrcz.org.zw +263 79 17 92 / 79 11 93).


___________________  __________________  __________________

Zita rangu          Zuva                Siginecha

Zita remutsvakurudzi  Zuva          Siginecha
F. Incwadi Yokuvuma Usazi okuvumayo

Umuntu Ole BP ephezulu

Isihloko Sesifundo: Ukuhlola ukwelatshwa ngemithi ephiwa kokuphela ebantwini abale BP ephezulu abahlala emadolobheni.

Umchwayisisi Omkhulu:

Ibizo: Petmore Mudziwepasi

Umnyango: Clinical Pharmacology

Ikheli: College of Health Sciences, University of Zimbabwe

Ucingo: 0772 996 880

Email: petmoreword@yahoo.com


okumayelana lamalungelo akho kulesi sichwayisiso, uyacelwa ukuthi uthintane lekhomidi ebizwa ngokuthi Joint Research Ethical Committee (JREC) esesibhedlela seParirenyatwa icele leUZ College of Health Sciences njalo ungababhalela kukheli ethi: mmchidzonga@medsch.uz.ac.zw kumbe ku Imbuzi@medsch.uz.ac.zw ucingo lwabo luthi +263 4 708140 kumbe njalo uthintane lekhomidi ethiwa yi Medical Research Council of Zimbabwe (MRCZ) kumbe ubabhalele ku rcz@mrcz.org.zw ucingo lwabo luthi +263 4 791792/ 791193.