

**FACTORS INFLUENCING COMPLIANCE TO
LIFESTYLE MODIFICATIONS AMONG
HYPERTENSIVE PATIENTS ATTENDING
SPECIAL CLINIC IN NYAMIRA COUNTY
REFERRAL HOSPITAL, KENYA**

A Thesis Submitted to the
Department of Public Health
School of Health Sciences
University of Eastern Africa, Baraton

In Partial Fulfillment of the Requirements for the Degree of
Master of Public Health
(Generalist and Health Promotion)

Stephen Marita Ogega

June 2017

APPROVAL SHEET

This thesis entitled *Factors influencing compliance to lifestyle modifications among hypertensive patients attending special clinic in Nyamira County Referral Hospital, Kenya*, written and submitted by **Stephen Marita Ogega** in partial fulfillment of the requirements for the degree of Master of Public Health (Generalist and Health Promotion), is hereby accepted and approved.

Prof. Elizabeth Role
Supervisor

Date

Mrs. Asenath Nyantika-Barongo, MPH
Supervisor

Date

Accepted in partial fulfilment of the requirements for the degree of Master of Public Health (Generalist and Health Promotion).

Prof. Jackie K. Obey
School Dean

Date

Prof. Elizabeth Role
Director of Graduate Studies and Research

Date

ABSTRACT

Compliance to lifestyle modification is essential in the management of hypertension. The aim of this study was to identify factors that influence compliance to lifestyle modification among hypertensive patients attending special clinic at Nyamira County Referral Hospital. A descriptive correlational study design was used to describe, determine and evaluate individual, family, health services and socio-cultural factors that influence compliance to lifestyle modification among these patients. A structured self-administered questionnaire was used to collect data from each of 224 hypertensive patients who participated in the study. The data acquired was analyzed using frequencies, means and correlation and regression were to determine the relationships. The findings revealed that most of the respondents were non-compliant (80%) while only 20% were compliant to the lifestyle modifications. The inferential statistics findings indicated Pearson correlation scores as being; socio-cultural $(r=0.229, p=0.01)$, individual $(r=0.67, p=0.00)$, family $(r=0.581, p=0.00)$ and health service $(r=0.581, p=0.00)$. The percentages of contribution to compliance to lifestyle modification by each of the factors are: individual factors – 43%, health service factors – 7.3%, family factors – 7.7%. In conclusion, there is very low level of compliance to lifestyle modifications mainly accounted for by the individual, family, and health service factors but weak with socio-cultural factors. Therefore, there is need to develop health programs that will assist the hypertensive patients control the factors contributing to the low compliance to their engagement in lifestyle modifications.

AKNOWLEDGEMENT

I would wish to express my heartfelt appreciation to our dear God for His continuous support and direction during the study period and for his protection care and strength that he gave me to overcome all the difficulties on my way when writing this thesis. I would also like to significantly thank my parents and most sincerely my lecturers; Ms Asenath Nyantika- Barongo and Prof. Elizabeth M. Role for their dedication and commitment they demonstrated when guiding me to write this thesis.

I would not forget to thank my family members and friends for their support and encouragement that they gave me throughout the thesis development process.

May the Almighty God bless you.

DEDICATION

To my wife, Grace Kerubo Marita, my children and my mother whose love, understanding and support encouraged me, I dedicate this work.

TABLE OF CONTENTS

APPROVAL SHEET.....	i
ABSTRACT.....	ii
AKNOWLEDGEMENT.....	iii
DEDICATION.....	IV
TABLE OF CONTENTS	V
LIST OF TABLES	VIII
LIST OF ABBREVIATIONS & ACRONYMS	XI
CHAPTER ONE	1
INTRODUCTION.....	1
BACKGROUND OF THE STUDY	1
STATEMENT OF THE PROBLEM	3
BROAD OBJECTIVE	4
SPECIFIC OBJECTIVES	4
HYPOTHESES.....	5
JUSTIFICATION OF THE STUDY	5
SIGNIFICANCE OF THE STUDY	6
THEORETICAL FRAMEWORK.....	7
CONCEPTUAL FRAMEWORK.....	9
DEFINITIONS OF TERMS	11
REVIEW OF RELATED LITERATURE AND STUDIES	12
HYPERTENSION.....	12
WORLDWIDE SITUATION OF HYPERTENSION.....	13
HYPERTENSION IN AFRICA.....	14
KENYAN SITUATION	15
MANAGEMENT OF HYPERTENSION	16
CHALLENGES FACED IN MANAGEMENT OF HYPERTENSION	17
LIFESTYLE MODIFICATION	18
DIETARY MODIFICATION	19
WEIGHT REDUCTION	20
NON-COMPLIANCE	22
<i>Importance of Compliance</i>	23
<i>Level of Compliance to Medication</i>	29
<i>Effects of Non-Compliance</i>	31
<i>Effects of Non Compliance among Hypertensive Patients</i>	33
LIFESTYLE MODIFICATION IN HYPERTENSION	34
FACTORS INFLUENCING COMPLIANCE AND NON-COMPLIANCE	34
FACTORS AFFECTING NON-COMPLIANCE	35

SOCIO-CULTURAL FACTORS INFLUENCING COMPLIANCE	37
LEVEL OF COMPLIANCE AND NON-COMPLIANCE TO LIFESTYLE MODIFICATION	40
HEALTH SERVICE FACTORS INFLUENCING COMPLIANCE	41
CHAPTER THREE	43
RESEARCH METHODOLOGY	43
RESEARCH DESIGN	43
POPULATION AND SAMPLING TECHNIQUES	43
<i>Inclusion Criteria</i>	44
<i>Exclusion Criteria</i>	44
SAMPLE SIZE DETERMINATION	44
RATE WAS 100%	44
SAMPLING TECHNIQUE	44
RESEARCH INSTRUMENTS	44
PILOT STUDY	45
DATA GATHERING PROCEDURES	45
STATISTICAL TREATMENT OF DATA	47
ETHICAL CONSIDERATIONS	47
PRESENTATION OF FINDINGS DATA ANALYSIS AND	
INTERPRETATION	49
DEMOGRAPHIC PROFILE OF RESPONDENTS	49
AGE OF RESPONDENTS	49
LEVEL OF COMPLIANCE TO LIFESTYLE MODIFICATION AMONG HYPERTENSIVE	
PATIENTS ATTENDING THE SPECIAL CLINICS IN NYAMIRA COUNTY REFERRAL	
HOSPITAL	54
EVALUATION OF FACTORS AFFECTING COMPLIANCE BY HYPERTENSIVE	
PATIENTS ATTENDING SPECIAL CLINIC IN NYAMIRA COUNTY REFERRAL	
HOSPITAL	56
RELATIONSHIP BETWEEN COMPLIANCE TO LIFESTYLE MODIFICATION AND THE	
INDEPENDENT VARIABLES	62
FACTORS THAT BEST INFLUENCE COMPLIANCE TO LIFESTYLE MODIFICATION	
AMONG HYPERTENSIVE PATIENTS ATTENDING SPECIAL CLINIC IN NYAMIRA	
COUNTY REFERRAL HOSPITAL	65
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	69
SUMMARY OF THE STUDY	69
SUMMARY OF FINDINGS	69
CONCLUSIONS	70
RECOMMENDATIONS	70
REFERENCES	72
APPENDIX 1: RESEARCH QUESTIONNAIRE	82
APPENDIX 2: INFORMATION AND CONSENT FORM	89
APPENDIX 6:	100

CURRICULUM VITAE 100

LIST OF TABLES

Table

1. Showing Application of HBM Constructs to the Study	9
2. Life Style Modification to prevent and Manage Hypertension	24
3. Level of compliance to lifestyle modification	59
4. Socio- cultural factors	62
5. Individual factors	63
6. Family factors	64
7. Health Service Factors	66
8. Correlation coefficients	67
9. Regression Model Summary	70
10. Regressions coefficients	71

LIST OF FIGURES

Figure:

1. THEORETICAL PROPOSITIONS OF THE HEALTH BELIEF MODEL	8
2. THE THEORY OF REASONED ACTION.	10
3. THE CONCEPTUAL FRAMEWORK	11
4. SHOWING AGE OF RESPONDENTS	53
5. SHOWING GENDER OF RESPONDENTS	54
6. SHOWING THE MARITAL STATUS OF RESPONDENTS.	55
7. SHOWING LEVEL OF EDUCATION OF RESPONDENTS	56
8. SHOWING THE OCCUPATION OF RESPONDENTS	57
9. SHOWING RESIDENCE OF RESPONDENTS	58

LIST OF ABBREVIATIONS & ACRONYMS

AHF	American heart Foundation
CCM	Chronic Care Model
DALYS	Disability Adjusted Life Years
HBM	Health Belief Model
HBP	High Blood Pressure
HF	Heart Foundation
HPN	Hypertension
IDF	International Federation
KDMI	Kenya Management and Information Center
KNHF	Kenya National Heart Foundation
NCHSU	National Center for Health Statistics US
NCRH	Nyamira County Referral Hospital
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

Background of the Study

High blood pressure is responsible for 7.5 million deaths each year, about 12.8% of the total deaths worldwide; and 80 percent of those deaths occur in low-and middle-income countries, leading to extremely high levels of cardiovascular diseases. This accounts for 57 million Disability Adjusted Life Years (DALYS) or 3.7% of total DALYS (WHO, 2009).

Consequently, hypertension if left untreated can lead to Heart attack, Stroke, Kidney Failure & Eye Damage (glaucoma, blindness) (Anwer, 2011). Hypertension has been identified as the third ranked condition that reduces life expectancy in the world (Zongu , Djumbe & Setswe, 2013). In Africa, Hypertension is one of the continent's greatest health challenges after (Acquired Immuno Deficiency Syndrome) AIDS (Zongu , Djumbe & Setswe, 2013).

People with hypertension have approximately twice the risk of getting cardiovascular disease as non-hypertension. Hypertensive diabetic patients are also at increased risk for -specific complications including retinopathy and nephropathy (Anwer et al., 2011).

Hypertension continues to be major public health problems (WHO, 2013). Lack of compliance to lifestyle modifications leads to increased mortality (Harris, 2007). Moreover, lifestyle modification has been reported as the best method for successful management of hypertension in populations (Gupta, 2010).

This one major public health condition affect nearly one billion people worldwide (WHO, 2013). Wherein, hypertension has been shown to be a common condition in diabetics affecting about 20-60% of patients with (Anwer et al., 2011). Consequently, reports have shown that the global burden of disease attributable to hypertension has increased from 4.5% in 2000 to 7% in 2010 (Van de Vijver et al., 2013). 2014). In Europe, the prevalence of hypertension is 44%, while in North America its 28% (WHO, 2013), and in the US its 29% (CDC, 2015).

Hypertension is a growing public health challenge in Kenya that impacts the health of citizen negatively. In rural areas, it's been shown that almost 1 in 3 individuals aged 45-54 years are affected by hypertension (Onen, 2013). In 2008, the hypertension prevalence was reported to be at 50.1% (Joshi, et al 2014). Moreover, a study by Kenya Management and Information Center (KDMI) shows that the prevalence of hypertension ranges between 2.7% in rural areas and 10.7% in urban areas (KDMI, 2015).

Similarly, in Nyamira County there has been an increase in the number of hypertension cases. During medical camps it has been observed that 3 out of ten people who had visited it had high blood pressure or had been newly diagnosed. The health authorities has noted these as new threats in the county, which is worrying and needs urgent intervention to help both the affected and the population that is at risk of encountering the problems (Nyabonyi, 2015).

Hypertension is mainly managed through pharmacological means and lifestyle modification (WHO, 2015). Studies have shown that the use of appropriate lifestyle modification is key factor in the control of hypertension and reduction in associated risk of complications associated with these two conditions (Harris, 2007). However, compliance with lifestyle modificaitons is often sub-optimal especially in developing

countries (Harris, 2007). Hence, is a major setback in the fight against hypertension (Mohan et al., 2007).

A study done in Taibah University indicated that lifestyle modification to compliance among hypertensive patients was 35.1% (Mahmoud, 2012). Others studies have shown adherence rates of 65% for diet but only 19% for exercise; and adherence for medications use being higher than for lifestyle changes (Harris, 2007). In India, compliance to physical activity, foot care, annual eye and renal check-up was low (Mohan et al., 2007). Moreover, in Kenya reports show that 41% of patients are unwilling to adopt healthier lifestyles (Maina et al., 2011).

However, in Nyamira County, there is no information on the level of compliance to either medication use nor lifestyle modification. Therefore, there is need for need for this study to establish the level of compliance to lifestyle modification and the factors influencing the either the compliance or non-compliance to lifestyle modifications among the hypertensive patients in Nyamira County.

Statement of the Problem

In Nyamira County, there is an increased prevalence of hypertension related to lifestyle and has become a threat in the population. Consequently, the disease is a burden to both the community and County government which is worrying and need of urgent intervention to help both the affected and the population that is at risk of encountering the problems (Nyabonyi, 2015).

Compliance with antihypertensive drug therapy and lifestyle motivations (AHT) has been shown to reduce the risk of stroke and coronary heart disease by an estimate of 34% and 21%, respectively (Law et al., 2003). However, studies revealed that medication therapy improves life expectancy and quality of life. Several studies have shown that patients with chronic conditions such as hypertension adhere only to

50-60 percent of medications as prescribed (Benner et al., 2002). Hypertension is a particularly important issue among people with a significant contributor to complications of such as kidney failure and retinopathy as well as increasing cardiovascular mortality treatment (Anthony et. al., 2012).

This study was conducted in Nyamira County Referral hospital to establish the factors that indeed influence the compliance to life style modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

Broad Objective

To determine the factors influencing compliance and to lifestyle modification among hypertensive patients attending special clinics at Nyamira County Referral Hospital in Kenya

Specific Objectives

1. To assess the level of compliance to lifestyle modification among hypertensive patients attending the special clinics in Nyamira County Referral Hospital.
2. To evaluate the personal factors (socio-cultural, individual and family) and health-related factors among hypertensive patients attending special clinic at Nyamira County Referral Hospital
3. To establish if there is a significant relationship between compliance to lifestyle modification and each of the following factors among hypertensive patients attending special clinic in Nyamira County Referral Hospital.
 - a. Socio-cultural factors
 - b. Individual factors
 - c. Family factors
 - d. Health service factors

4. To determine the factors that best influence compliance to lifestyle modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

Hypotheses

H₀: The following factors have no significant influence on compliance to lifestyle modification among hypertensive patients attending special clinics at Nyamira County Referral Hospital.

- a. Socio-cultural factors
- b. Individual factors
- c. Family factors
- d. Health service factors

Justification of the Study

Most of the research done on hypertension that relates to adherence or compliance has mainly focused on anti-hypertensive medication. Moreover, studies have also been done on factors influencing poor compliance or adherence to medication among hypertensive patients (Brundisini, et al, 2015). Most of these studies have mainly been done in Europe, America, Asia in India (Divya & Nadig, 2015; Santhanakrishnan, Lakshminarayanan & Kar, 2014) and Saudi, Arabia (Khan, et al, 2012).

Research done in Africa, has mainly concentrated on factors associated with adherence to anti-diabetic regimens in Uganda (Baonza, Rutebemberwa & Bazeyo, 2015). While in Nigeria, there have been studies on factors influencing poor management outcomes (Nwankwo, Nandy & Nwankwo, 2010) and non-adherence to medication and both in Nigeria and Ghana (Boima *et al.*, 2015). In Tanzania (Joho,

2012) and Ethiopia (Ambaw, Alemie & Mengesha, 2012); studies have been reported on factors affecting anti-hypertensive treatment compliance among patients.

Studies in Kenya have been on the increasing burden of hypertension in the community (Jones, 2013). Moreover, research shows and recommends that in order to facilitate treatment adherence with lifestyle changes, there is need to assess and address the convictions and confidence of patients through customized plans which help the patient to overcome their barriers to adherence (Koenigsberg, Barlett & Cramer, 2004). This is because studies have reported that treatment of hypertension fails when patient-related barriers towards treatment are not recognized. Therefore, the need for a better assessment and understanding of these barriers allows optimal tailoring of interventions (Meinema et al., 2015).

Considering the foregoing and the little information level of lifestyle modification in Kenya, and Nyamira County as relates to management and control of hypertension, this study therefore, was carried out to determining the level of compliance to lifestyle modifications and the factors influencing the compliance among hypertensive patients in Nyamira County Referral Hospital.

Significance of the Study

The findings of this study will be used to identify and develop better counseling skills that are more related to compliance to lifestyle modification. Furthermore it will be used in providing interventions on lifestyle modifications by health care providers based on the patient's perspectives on the factors affecting their compliance. The information will also be used to improve existing and develop new policies that will be used both at Nyamira Country Referral Hospital and the entire Ministry of Health Sector in the management of hypertensive patients within Kenya. The knowledge gained from this study will help to guide the service delivery and

management of the hypertensive patients. Furthermore, the findings of this research will be used by public health professionals in the development of health promotion programs for those with hypertension and their families or caregivers. The health programs will help to enhance the knowledge and importance of adherence and the implications of non-compliance to lifestyle modifications among those at risk and with hypertension and their caregivers and families.

Theoretical Framework

This study is based on the Health Belief Model (HBM) to explain the occurrence of the various concepts. Engagement in the recommended lifestyle modification by hypertensive patients can be explained by the four constructs found in the Health Belief Model. The HBM was spelled out in terms of four constructs representing the perceived threat and net benefits: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Figure 1 shows the HBM propositions and Table 1 shows the application of the HBM constructs to this study.

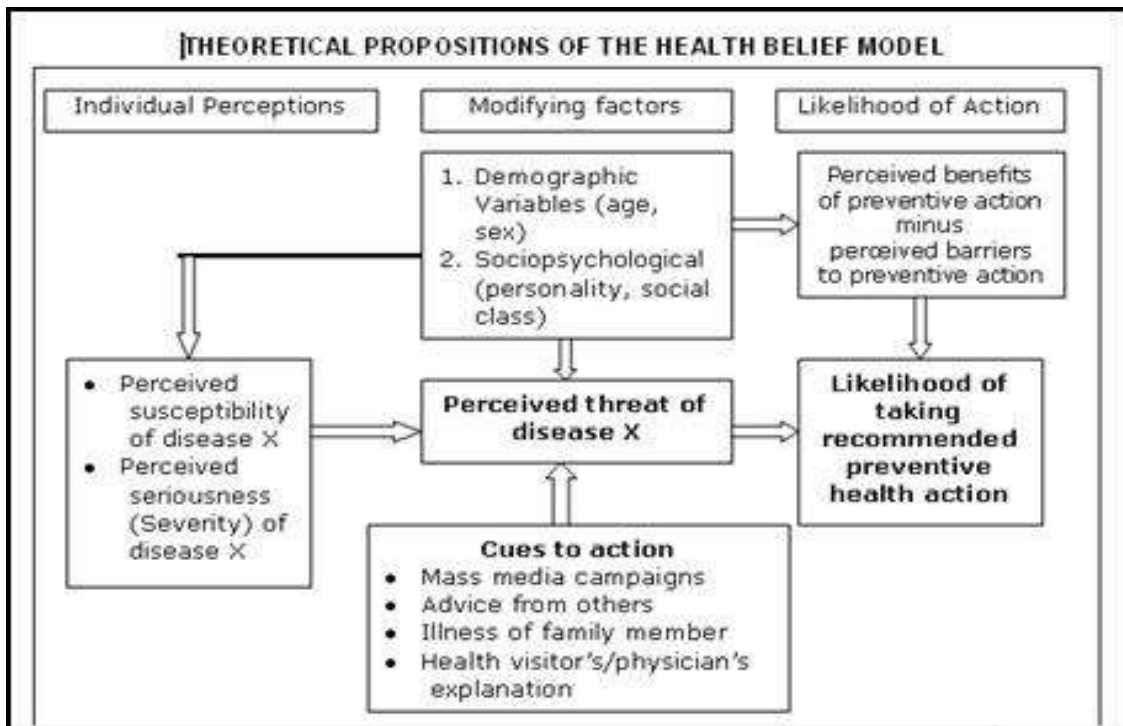


Figure 1. Theoretical propositions of the health belief model.

Furthermore, table 1 below the application of HBM on some of the factors influencing engagement in lifestyle modification.

Table 1

Showing Application of HBM Constructs to the Study

Concept	Definition	Application in the study
Perceived Susceptibility	By knowing that lack of lifestyle modification will lead to severe hypertension	How one is susceptible to hypertension
Perceived Severity of hypertension and	Hypertensive and diabetic patients opinion on the possible severity the two condition on failing to adhere with lifestyle modifications	How severe it is hypertension and influences how one comply with lifestyle modifications
Perceived Benefits	The benefits of complying lifestyle modifications	Is there any positive effects of complying to lifestyle modification as perceived by hypertensive and diabetic patients in Nyamira County
Perceived Barriers	These are perceived barriers to lifestyle modifications: Social, cultural, cost, time and occupation	The study intends to identify barriers that contribute to non-compliance to lifestyle modifications in Nyamira County in Kenya.
Cues to Action	Do hypertensive and diabetic patients receive formal education how to comply with lifestyle modifications.	The study intends to provide information on importance of lifestyle modification in reducing the severity of hypertension and
Self-Efficacy	The hypertensive and diabetic patients may not be possessing self-confidence to follow strictly lifestyle modification	By explaining possible barriers which interfere with lifestyle modification in Nyamira County, could also improve self confidence in complying with lifestyle modification among hypertensive and diabetic patients.

Besides, this study can be explained using the Theory of Reasoned Action and Planned Behaviour (Ajzen, 2001). The behaviours or engagement in lifestyle modification practices for hypertension depends on intention which is influenced by the attitude, based on behavioural beliefs, based on individual, social and information

factors. There is also the normative beliefs which affect the subjective norm and hence the intention and the control belief which affects the perceived behavioural control hence the intention to engage in lifestyle modification.

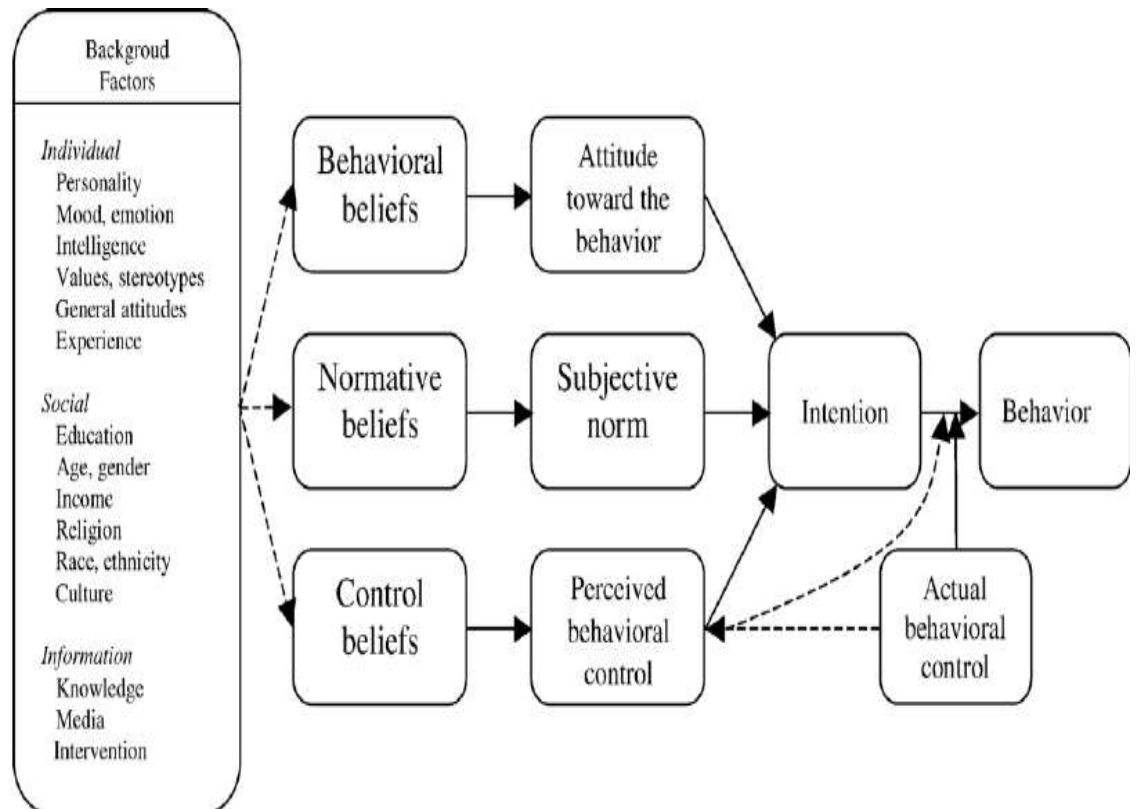


Figure 2. The theory of reasoned action.

Conceptual Framework

Figure 3 is diagrammatic presentation of the factors which are the variables in this study in relation to the compliance or non-compliance to lifestyle modification.

In the present study, there are four independent variables which determine compliance and non-compliance to lifestyle modification among hypertensive patients. It includes individual factors, health care system factors, family factors and socio-cultural factors. These four independent variables influence the dependent variable which is compliance or non-compliance to lifestyle modification among hypertensive patients attending special clinics in Nyamira County Referral Hospital.

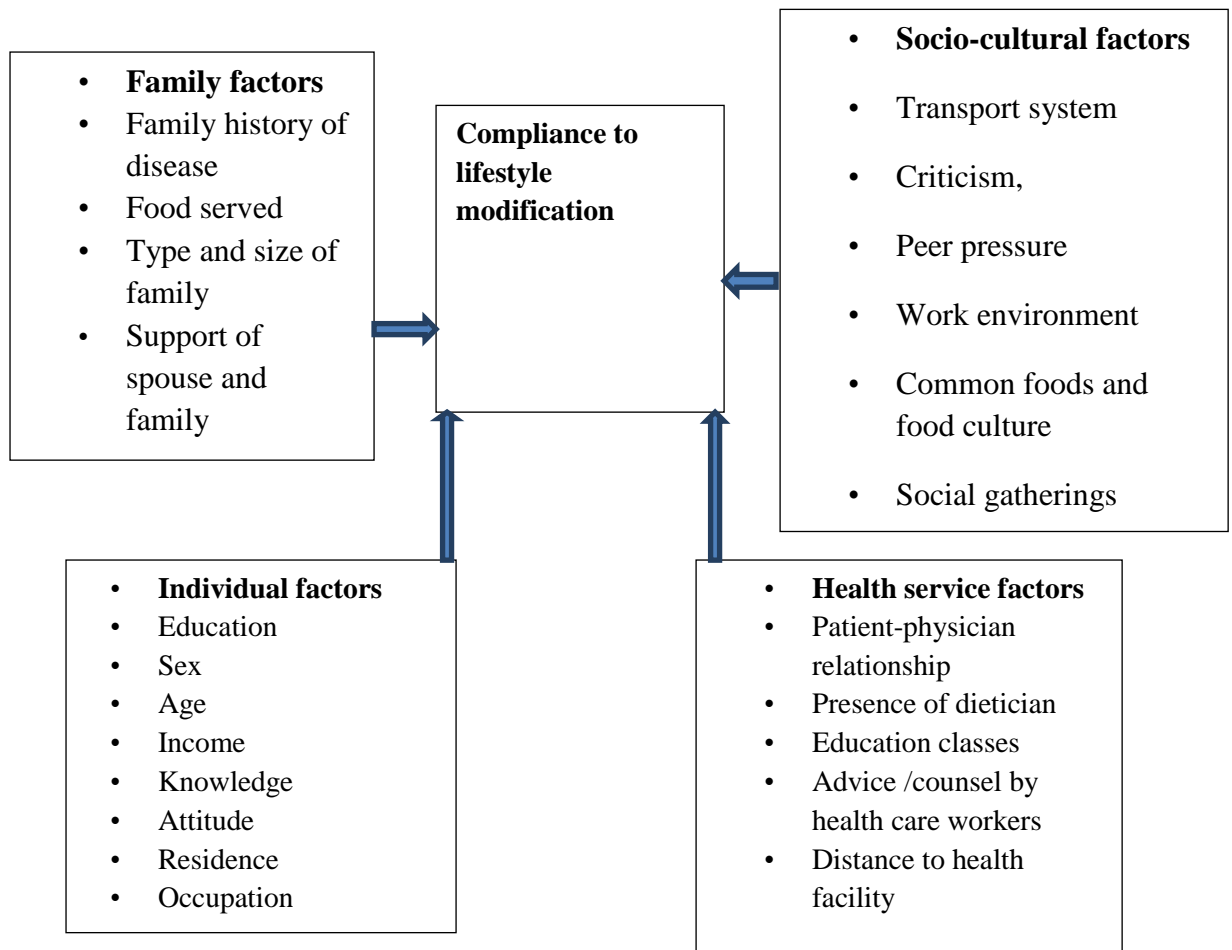


Figure 3. The conceptual framework.

Firstly, the individual factors which determine compliance include: sex, marital status, occupation, age, level of education, income, disease factors, knowledge, attitude and residence of person. Secondly, the health care system or service factors include; distance to health facility, regularity of appointments, patient-physician relationship, lifestyle modification class offering, and advice on lifestyle modification by the health facility workers. Thirdly, the family factors that include support of spouse and/or family, nature of family meals, willingness to serve different diet from rest of family, size and type of family, income of family, family history of disease, having maids. Last but not least, the socio-cultural factors such as peer pressure, work environment, social gatherings, dietary practices, climatic and weather

conditions, level of criticism, transport system and cultural support to lifestyle modification practices.

Definition of Terms

Compliance	conforming to a rule, such as a medical specification
Culture	<p>The characteristics and knowledge of a particular group of people, defined by everything from language, religion, cuisine, social habits, music and arts.</p> <p>This is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces.</p>
Family factors	Family behaviors considered as a factor that influence lifestyle modifications.
Health factors	These include factors like availability of the services which influence the hypertensive patient lifestyle medications.
Hypertension	Is a condition in which the blood vessels have persistently raised pressure, putting them under increased stress.
Life style modifications	involves altering long-term habits, typically of eating or physical activity, and maintaining the new behavior
Peer pressure	Is influence on a peer group, observers or individual exerts that encourages others to change their attitudes, values, or behaviors to conform to groups.

CHAPTER TWO

REVIEW OF RELATED LITERATURE AND STUDIES

This section provides the literature and study carried out by different researchers on the lifestyle modification among patients with high blood pressure. The literature starts with definition of hypertension and then presents the literatures and related studies done before this research.

Hypertension

Hypertension is explained as the high blood pressure against the walls of the blood vessels characterized by persistence raised systolic and diastolic levels. High Blood pressure is defined as when the systolic reading is between 100mmHg and 140 mmHg and diastolic reading is between 60mmHg and 90 mmHg (Kearney et al., 2005; Miller et al., 2009; Awad et al., 2015). Moreover, the World Health Organization (WHO) and the International Society of Hypertension (ISH) have developed new parameters to describe different ratings of hypertension either as mild (greater than 140/90 but less than 160/100); moderate (less than 180/110); severe (less than 210/120); and very severe (greater than 210/120) (Awad et al., 2015).

High blood pressure is categorized either as primary hypertension, essential or secondary hypertension depending its cause (Awad et al., 2015). Majority of the people with hypertension do not know the cause of their high blood pressure only 5 percent of hypertensive patients know. This type of hypertension where the cause is not known is called essential or primary hypertension and when the cause is known that is called secondary hypertension. (WHO, 2014). Therefore, secondary hypertension is responsible for between 5-10% of all hypertension cases with fully knowledge of the cause of the hypertension. (Awad et al., 2015). Thus blood pressure

can be increased by things such as: sleep apnoea, drugs such as contraceptive pills and anti-inflammatory pills, apnea, chronic renal disease; aldosteronism; reno vascular disease; steroid therapy; cushing syndrome, phaeochromocytoma and coarctation of the aorta (AHF, 2016; WHO, 2013).

Worldwide Situation of Hypertension

Majority of deaths in many countries of the world are due to non-infectious diseases posing rising crisis to both national, global health and social-economic development causing increasing panic among governments, non-government organizations and the scientific community as a chronic global epidemic. Their effects are deemed to twofold by 2030 (Demaio *et al.*, 2013). Hypertension is the leading non-infectious disease in the world and it causes major public health challengers globally because of its high morbidity and (Awad *et al.*, 2015; Okonta *et al.*, 2014).

The World Health Organization (WHO), states that nearly one billion people are suffering from hypertension and majority of these people live in both developed and developing countries. Hypertension is the main cause of cardiovascular disease and thus it is the third major killer disease in the world because approximately 1 in 8 deaths globally is due to high blood pressures translating to about 7.1 million deaths annually, accounting for 13% of all deaths globally (Awad *et al.*, 2015).

Hypertensive patients are likely to develop heart disease, peripheral vascular disease, chronic kidney disease and cerebrovascular diseases as a result of high pressure. The rising burden of hypertension which is a renown public health concern, – has resulted due the current swift epidemiological changes and the modern dietary, socio-economic and modification of lifestyle in this population. Moreover, the quick economic growth coupled with urban migration is a phenomena likely to rise in the near future, (Demaio *et al.*, 2013).

The management of hypertension is a continuous task globally despite being the major risk factor of cardiovascular diseases. Reports reveal that approximately one-half adult suffering from the disease in 2009-2012, hypertensive patients. National Center for Health Statistics US. "Health Risk Factors" (NCHSU, 2014). Consequently, proper management of hypertension will decrease cardiovascular morbidity and mortality. In view of numerous clinical tests in high blood pressure shows that lessing hypertension is connected with lessening incidences of ischemic heart disease, congestive heart failure, renal failure and stroke. "However, studies worldwide indicate that despite the availability of effective medical therapy, over half of all hypertensive do not take any treatment. It has therefore been recommended that compliance to antihypertensive drugs and life style modification will play an important role for the control of hypertension hence reduce cardiovascular morbidity and mortality" (Mahrous, 2015; Joho, 2012).

Hypertension in Africa

In Sub-Saharan Africa, hypertension has also emerged as a serious public health problem; whose, prevalence has increased significantly over the past two to three decades. Previously, high blood pressure was almost non-existent in African societies especially, in the first half of the twentieth century. Reports show current estimates in some settings in Africa where more than 40 percent of adults have hypertension. This is due to the effects of Westernizations, urbanization, changes in dietary patterns and sedentary lifestyles. Especially, the increase in tobacco use, excessive alcohol consumption, reduced physical activity and adoption of "Western" diets that are high in salt, refined sugar and unhealthy fats and oils (Vijver et al., 2015). Moreover, hypertension is the most rapidly increasing cardiovascular disease,

affecting over 20 million people and is the most common cardiovascular cause of hospitalization and mortality (Chimezie et al., 2014; Vijver et al., 2015).

Consequently, Sub-Saharan Africa is witnessing major rapid epidemiological and economical transition of world history with the growing burden of , especially type 2, that is already overwhelming health care system. Consequently, most people diagnosed with extremely find it difficult to achieve and maintain the desired glycaemic level of control (HbA1c < 7%). This is due to chronic shortages of drugs (including insulin) and the high cost, which are the major factors for the poor glycaemic control (Otieno et al., 2003, Skyler, 2004; Bisiriyu, 2010). Therefore, primary prevention based on strict adherence to lifestyle modification recommendations must be the cornerstone of health policies to fight in Africa. Thus for, primary prevention to be successful, obstacles such as low awareness, lack of being prioritised on national health-care agendas, inadequate funding and resources for national programmes, and shortage of drugs (including insulin), manpower and health facilities in rural areas must be adequately addressed (Bisiriyu, 2010).

Kenyan Situation

The government of Kenya in its reports of 2014 showed that lifestyle related diseases such as hypertension, heart disease and cancers are increasing. This poses a threat to the health care system in terms of diverting resources from basic health care services (MOH, 2014).

The WHO organization reported 1,995 hypertension deaths and ranked Kenya number 120 (WHO, 2014). The prevalence in Nairobi slum area was 19% (Van de Vijver et al., 2013). In rural Kenya, reports give age-standardized prevalence of 23.7%. (Hendriks et al., 2012). Moreover, reports of study done in Nairobi slum reported an age-standardized prevalence of 22.8%) (Joshi et al., 2014).

Consequently, studies shows that there are many challenges in controlling hypertension in Kenya and this is confirmed by data from Kenyatta National hospital in 2009, which shows that it was exactly 26% patient who had controlled their hypertension, however in Nyeri Provincial General Hospital it was 33.% (Mutua et al., 2014).

Currently there are several causes that are considered to influence the increasing of hypertension Kenya and they are commonly connected with urbanization and lifestyle changes such as eating refined food that has also high fats, lack of physical exercises caused by availability motorized transport, spending long hours on computers or television (IDF, 2010).

Studies have reported use of public health interventions to prevent or delay the onset of its complications. The interventions often target individuals at risk of the disease and focus on reducing the risk factors at the community. They have entailed intensive lifestyle modification for those at risk of the disease and aggressive treatment for those with the disease (Maina, et al., 2011). However, it has been observed that although substantial resources have been invested in the treatment and control of the disease in several developed and developing countries (Fitzsimons et al., 2002, Jayed et al., 2002); management and outcomes remain unsatisfactory and Kenya as a developing country is not an exception (Maina et al., 2011).

Management of Hypertension

High blood pressure is prevented and controlled by use of drugs and lifestyle modification. (WHO, 2015). Studies reveal that lifestyle modification is the major factor in the management of hypertension and in preventing its related complications (Harris, 2007).

Management of hypertension uses a two-pronged approach, with emphasis on lifestyle measures and add-on drug management. Lifestyle management has an important role in both non-hypertensive and hypertensive individuals. In non-hypertensive individuals, including those with pre-hypertension, lifestyle modifications have the potential to prevent hypertension and more importantly to reduce BP and lower the risk of BP-related clinical complications (Appel, 2012).

In hypertensive individuals, lifestyle modifications can serve as initial treatment before the start of drug therapy and as an adjunct to drug therapy in persons already on medication. In hypertensive individuals with medication-controlled BP these therapies can facilitate drug step-down in individuals who can sustain lifestyle changes (Appel, 2012). This is because management of hypertension comprises use of drug and lifestyle modification measures. However, use of drug to manage hypertension require timely and regular intake of drugs (Santhanakrishnan, Lakshminarayanan, & Kar, 2014).

Challenges Faced in Management of Hypertension

The control of hypertension has been very difficult globally because of the prevailing barriers that are related to the patient himself/herself, physician, or health system level. Moreover, hypertension has continued to dominate among patients due to patient related behaviors such as unrealistic expectations of treatment, erroneous health belief, side effects of drugs, side effects of hypertensive drugs, unawareness of lifestyle modification, and inability to make lifestyle changes. This is also happening because patients are not knowledgeable about hypertension and its consequences. (Chimezie et al., 2014).

Correspondingly, there is poor adherence with therapeutic guidelines; inadequate understanding of therapeutic goals and failure to emphasize the lifestyle

modifications necessary in the management of hypertension are major physician-related barriers. Further, an inefficient health care system with low socioeconomic status may present a barrier to blood pressure control, given that the inaccessibility of hospitals, high costs of screening and treatment may hinder optimal control of hypertension in the low socioeconomic groups (Chimezie et al., 2014).

However, the extent to which patients lifestyles coincide with clinical prescriptions has become an important management challenge in primary care (Iloh et al., 2014). Moreover, its complications have huge disease burdens globally especially in developing countries. Morbidity and mortality has been reported in one African country to be due to poor management and noncompliance with global guidelines (Nwankwo et al., 2010).

Lifestyle Modification

Conceptually, lifestyle refers to the pattern of an individual's behavioral choices and practices with respect to daily activities that are related to elevated or reduced risk of hypertension or serve as adjunct to its treatment (Iloh et al., 2014).

Lifestyle modifications are non-pharmacological approaches necessary to lower high blood pressure. Study shows that lifestyle modifications are fundamentally essential for patients with hypertension and should form an integral part of the management of those with the disease. In addition, the WHO strongly recommends lifestyle modifications since such treatment usually has no known adverse effects, do not affect the quality of life, and are usually less expensive than pharmacological treatment (Edo, 2009).

Accumulating evidence has shown that appropriate lifestyle modification serves as an adjunct to the management of hypertension and reduces the risk of hypertension and its primary co-morbidities. Lifestyle modification therefore has a

great impact on the success or failure of therapeutic management of hypertension (Iloh et al., 2014). The first line of treatment for hypertension is lifestyle modification (Awad et al., 2015). Lifestyle modifications (LSMs) are indispensable in blood pressure control among hypertensive patients. Correspondingly, the major lifestyles shown to lower blood pressure include adoption of Dietary Approach to Stop Hypertension (DASH)-eating plans, dietary sodium reduction, weight reduction in overweight or obese hypertensive, regular physical activities, social habits such as moderation of alcohol consumption and cessation of smoking, adequate dietary fruits and vegetable consumption and reduction of saturated fat intake (Iloh et al., 2014).

Dietary Modification

Dietary modifications are mainstay for prevention and initial treatment of hypertension. In hypertensive patients, in addition to a well-balanced diet, the dietary sodium intake should be limited to 65 to 100 mmol/day (Johnson, 2012; Xin, 2001). Likewise, evidence from epidemiological studies, clinical trials, and meta-analyses suggests that with increase in dietary salt (sodium chloride) intake, BP also rises. BP reduction is highest in the group with the lowest sodium levels. In addition, clinical trials have documented that a reduced sodium intake can prevent hypertension (relative risk reduction of about 20% with or without concomitant weight loss), can lower BP in the setting of antihypertensive medication, and can facilitate hypertension control (Whelton, 2009).

Moreover, 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. Limit salt intake by choosing foods processed without salt, foods labelled ‘no added salt’ or ‘low salt’ (or ‘reduced salt’ products when other

options are unavailable avoiding high-salt processed foods, salty snacks take away foods high in salt, salt added during cooking or at the table (CDC, 2014).

Other recommendations are: following a diet low in saturated fat and cholesterol, and one that emphasizes fruits, vegetables and low-fat dairy products, dietary and soluble fibre, whole grains and protein from plant sources alcohol intake should be moderated (Johnson, 2012).

Study shows that high potassium diet decreases systolic blood pressure between 4-8 mmHg in patients suffering from hypertension and 2mmHg in patients with normal blood pressure (CDC, 2014). Consequently, world health organization(WHO) states that food does not only provides higher amount of potassium than does pill but also supplies other kinds of nutrients necessary for the body building and the best source for these vitamin include fruits and vegetables not supplements (WHO, 2013).

Equally, a study (WHO, 2013) exhibited a current meta-analysis of 15 exhibited that reduction in alcohol drinking decreased systolic and diastolic blood pressure y 3.3 and 2.0 mHg, correspondently. Existing evidence support reduction of alcohol consumption as the best way in the control of hypertension (WHO, 2013).

Plants are the main source of dietary fiber that contain indigestible components. Studies and others scientific tests reveal that high intake of fiber influence reduction of hypertension. Several other scientific trials on fiber intake reported that additional fiber of about 14g/d was connected with systolic and diastolic blood pressure of 1.6 and 2.0 mmHg (Klatsky, 2007).

Weight Reduction

Study shows that reduction of every 1% body weight has been known to decrease high blood pressure by an average of 1 mmHg. Consequently, study show

that lowering body weight just by 4.5 kg will lower blood pressure and prevent hypertension significantly in people with people who are overweight. Besides, reduction of body weight of 10kg might reduce systolic blood pressure mmHg by 6-10mmHG. Further this study continues to report that lifestyle modification which include maintaining normal body weight (body mass index 18.5-24.9kg/m²), eating diet plenty in vegetables, fruits, low in fat contents especially saturated and total fat, minimizing dietary salt intake to less than 2400mg sodium per day or less than 6000mg sodium chloride per day, avoiding alcohol consumption, engaging in daily physical activities such as brisk walking at least 30 minutes per day most days of the week will reduce systolic blood pressure between 2-20mmHg.

Table 1

Life Style Modification to Prevent and Manage Hypertension

Modification	Recommendation	Approximate systolic blood pressure reduction (range)
1. Weight reduction	Maintain normal body weight (body mass index 18.5-24.9kg/m ²)	5-20mmHg/10kg weight reduction
2. Adopt the DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat.	8-14 mmHg
3. Dietary sodium reduction	Reduce dietary salt intake to < 2400mg sodium per day or < 6000mg sodium chloride per day.	2-8 mmHg
4. Avoidance of alcohol consumption	Avoid alcohol consumption instead drink two litres (6-8 glasses) of water per day	2-4 mmHg
5. Physical activity	Engage in regular aerobic exercises such as brisk walking at least 30 minutes per day most days of the week.	4-9 mmHg

Compliance

Compliance is an important concept in the prevention and management of hypertension and it involves all departments that provide health services (Chatterjee, 2006). Compliance is explained as conformity to advice and treatment prescribed by the health care worker which continues over time. (Awad, 2015). Healthcare workers define compliance as the level to which the conduct of the patient takes medication, implements the lifestyle modification, takes medical tests or honors appointment from the physicians that concurs with healthcare provider's opinions (Khan, 2012).

Compliance and adherence are believed to be two synonymous terms and are defined as observance to the healthcare provider's instructions concerning the prescribed drugs " (Edo, 2009). The World Health Organization defines compliance as the degree to which the behaviors of a person in terms of taking drugs, eating nutritious diet, executing lifestyle modifications which agree with recommendations from a health care provider. (Chimezie et al, 2014).

Non-Compliance

Patient non-adherence is prevalent globally is a thoughtful healthcare issue that hinders effective delivery of healthcare services to (Khan et al., 2012); and this prevalence has been conveyed to all parts of the world (Zieger, 2011). Studies show that compliance to preventive and treatment of lifestyle instructions among patients with hypertension is an unusual challenge in the prevention and control of high pressure (Mumu et al., 2014; Mumu et al., 2014).

Whereas non-compliance is defined as non-adherence to medication, it also means failure in making lifestyle modifications, doing medical tests or honoring appointment with doctor. Consequently, non-adherences pose a major challenge more so to patients with chronic diseases (OtcM, 2011). According to research

findings non-adherence to lifestyle modification reveals that non-compliance leads to morbidity, earlier deaths among patients and deteriorates the health of people and rises the treatment cost (Serour et al., 2007).

According to research, Chatterjee (2006) states that the degree of non-compliance differ reaching from 50% to 80%. Non-compliance leads to high financial implications affecting current healthcare services which include; National Health Services, (NHS), at the same time inflating personal treatment cost serious affects medical research trials, the quality and the intended plan for studies an. Low compliance (Chatterjee, 2006).

Furthermore, treatment failure is deemed to be due to non-adherence and has been previously associated with ignorance about treatment and lifestyle modification, ((Santhanakrishnan, Lakshminarayanan & Kar, 2014; Chatterjee, 2006).

Importance of Compliance

Interventions aimed at improving adherence would provide a significant positive return on investment through primary prevention (of risk factors) and secondary prevention of adverse health outcomes (WHO, 2003). Adherence to therapeutic lifestyle measures reduces the risk of cardiovascular problems. Non-compliance can worsen the quality of life and add to the cost of medical care. Compliance with medical recommendations and the extent to which recommendations are followed present difficult and complex challenges as patients can find lifestyle behaviors (for example, diet and physical activity) hard to change and maintain for long periods. Understanding the barriers to adherence to lifestyle changes can help physicians to plan and implement more intensive interventions to assist patients facing the long-term task of achieving beneficial lifestyle changes (Serour et al., 2007).

Compliance with treatment at the individual level improves the quality of life by preventing complications and thereby premature death. To the immediate family, it prevents the negative psychological impact associated with sudden death or living with a family member suffering from a chronic debilitating disease such as a stroke. It also conserves family resources that would have been utilized to obtain health care (McFarlane et al., 2004).

It is generally believed that, anti-hypertensive medications are effective in reducing high blood pressure and have been shown to significantly reduce the risk of cardiovascular illness. It is further thought that patient's benefits to antihypertensive medication can be reduced because of low adherence (Hashmi et al., 2007).

To the larger society, compliance with drug treatment is a cost saving measure since it decreases the incidence of complications and the need for additional medications. To the health care system, compliance reduces the need for hospitalization and decreased workload on staff. Moreover, satisfactory outcomes of treatment could help boost the morale of the attending clinician whereas treatment failure could be a source of frustration (Biradar, 2012; Edo, 2009).

Individual and Family Factors Influencing Compliance

People with hypertension tend to see hypertension not as a disease but as a risk factor for myocardial infarction or stroke. They do not view it as a continuous, degenerative process of damage to the vascular system, but rather as a binary risk process, within which you can either be a winner (not become ill) or a loser. This makes non-adherence to treatment a gamble with a potential positive outcome. Patients are more likely to accept hypertension as a chronic illness with minor impact on their routine (Anthony et al., 2012).

Therefore, patient denial and non-adherence to hypertension treatment is a prevalent phenomenon reflecting a conscious choice made by the patient, based on his knowledge and perceptions regarding the medical condition and its treatment. There is a need to change perception of hypertension from a gamble to a disease process. Changing the message from the existing one of “silent killer” to one that depicts hypertension as a manageable disease process may have the potential to significantly increase adherence rates (Anthony et al., 2012).

The period of chronic disease may affect patients' compliance with treatment regimen. The longer the duration of the disease, the more apparent a patient becomes noncompliant to lifestyle modification and treatment regimen. This is in accordance with a study conducted in Egypt reported that the duration of the disease had no significant effect on patient compliance. In contrast previous earlier studies reported that an extended duration of the disease correlates with decreased medication compliance (Awad et al., 2015).

Level of non-adherence to physical activity differs with family history of which is statistically significant. Higher level of adherence is seen in those who have family history of type 2 than those who do not. Study shows statistical significant differences in adherence level to physical activity in relation to marital status. Non-adherence level is lower in married than divorced or separated. This might be due to the reason that married respondents get better spouse and family members support than divorce or separated. Consequently, studies reveal that the patients who were not supported by the spouse and the family members, only 14.2% were adherent to the exercise regimen (Parajuli et al., 2014).

Equally studies have shown a statistically significant difference between marital status and non-adherence level. Widowed are more adherent to dietary advice

than married and separated. The reason might be widowed are more free of any responsibilities and concerned about their health than others. Adherence to dietary advice is higher in those respondents who are nearer to hospital than those who are far and the difference was statistically significant (Parajuli et al., 2014).

Correspondingly, the relationship between marital status and treatment compliance was observed, where in married participants were more compliant with treatment (61.0%) than non-married participants (Joho, 2012). This result was comparable with result of other similar studies done, where; marital status might influence patients' compliance with medication positively, the help and support from a spouse could be the reason why married patients were more compliant to treatment than single patients (Jin et al., 2008). Moreover, distribution of participants by reasons of not complying with antihypertensive medication were determined, the reasons were stopping medication due to; cost of the medications, feeling well (asymptomatic), fear of the side effect, avoiding addiction of drugs and use of traditional medicine (Joho, 2012).

In relation to gender, non-adherence to dietary advice of female is higher than male respectively which is statistically significant (Parajuli et al., 2014). Similarly, studies have shown that females were more compliant (63.2%) compared with male (45.8%), which was statistically significant ($P=0.044$). Female patients have been found by some researchers to be better compliant to treatment (Jing et al., 2005; Fodor et al., 2005). A study done by Sulbarán and others on epidemiologic aspects of arterial hypertension in Maracaibo, Venezuela support the above point that female were more compliant than male. Impotence is the likely hood side effect which affects men on hypertensive medications; this might be the reason why male had low level of treatment compliance compared to female (Kearney et al., 2005; Mahrous, 2015).

With increasing age, the level of adherence decreases due to varied reasons, majority of old people have memory loose and reduced cognitive function. A related finding was stated by additional study where compliance level reduced with growing age (Parajuli et al., 2017). Research has shown that participants who were 64 and below years of age had higher level of treatment compliance compared to those with 65 and above years of age. Correspondingly, these results are comparable to those reported from the study done in North America. The possible explanation of these results might be the truth that, the young people have higher income since they are able to work and thus can afford to buy medication compared to older people (Krousel-Wood et al., 2009). Another possible reason is that older people might have more than one disease due to aging reason, which might have led them to using many drugs which make them tired, hence, stop taking drugs. Besides, cognitive and functional impairment in elderly patients increases their risk of poor drug compliance, so they need a family to remind, support and assist them in taking drugs (WHO, 2003).

Adherence rates are typically higher among patients with acute conditions, as compared with those with chronic conditions; persistence among patients with chronic conditions is disappointingly low, dropping most dramatically after the first six months of therapy (Haynes et al., 2002). Correspondingly, a study on factors associated with adherence on antihypertensive therapy indicated that 24% respondents took their drugs only when they feel signs and symptoms of hypertension. This type of patients had very low compliance. Similarly, very few patients knew the dangerous factors of high blood pressure. Worse still there were fewer patients who understood the complications of hypertension (Hashmi et al., 2007).

Education had a significantly effect on patients' compliance, where studies

have shown that compliance rate was higher among patients with a low level of education. This might indicate that poor people with low education might be more easily motivated to treatment by doctors, media and colleagues in developing countries (Awad et al., 2015). This is in contrast with the study conducted in Australia which reported that patient's education had a significant impact over patient compliance (Mark et al., 2007; Awad et al., 2015).

Similarly, contemporary studies reveal that a higher level of education among the hypertensive patients affects compliance. This is because the level of education may influence the ability to understand information, which favors knowledge on the disease and treatment adherence. One study reported that patients with a higher level of education had higher level of compliance (Jin et al., 2008).

Moreover, other studies have found that patients without formal education level (55.6%) had high treatment compliance compared to those with high education level (37.5%) (Jimmy & Rose, 2011). For instance, a study done in the UK, found that patients without formal education qualifications had better compliance with medication (Senior et al., 2004). This may be due to the reason that patients with lower educational level might have more trust in physicians' advice compared to those with higher level of education. From these results, it seems that educational level may not be a good predictor of treatment compliance. On the contrary to several studies it has been found that patients with higher educational level might have higher compliance (Okuno *et al.*, 2001; Ghods & Nasrollahzadeh, 2003; Yaruz et al., 2004) while other studies found no association (Stilley et al., 2004; Wai et al., 2005).

Physical activity adherence was upper in those with positive family history of hypertension than others, upper middle socioeconomic class respondents than lower ones, and from extended family than nuclear or joint ones. Divorced were more non-

adherent to physical activity than married and widowed patients. Moreover, a study has reported that the determinants of non-adherence to dietary advice included: female gender, increasing age, joint or extended family members, farther distance from hospital, poor knowledge about hypertension and advice by others than physicians. Beside, determinants for non-adherence to physical activity revealed were negative family history of diabetic modification, divorced status and lower socioeconomic class (Janaki, 2014).

Proper education had significant influence on adherence to prescribed food health care works. The studies revealed that respondents who were knowledgeable on lifestyle modification exhibited better compliant to diet.. But this was in contrast with the results about smoking whereby the study showed highly educated people were leading in smoking habit. . The study showed that the respondents living in rural areas were more compliant to lifestyle modification than those living in urban and semi-urban areas. However, the research also revealed that old age and unemployment were hindrance to compliance to lifestyle change. (Mumu et al., 2014).

Level of Compliance to Medication

Failure of patients to take drugs as advised by their physician is still the main barrier to treatment all over the world.. Findings of this study demonstrate that approximately 50% for drugs in chronic illness comprising hypertension scored much low in lifestyle prescriptions (Blanca et al., 2001). Further studies displays that hypertensive patients complied only between 50-60 percent of drugs as recommended the physician. Besides, the findings by the New England Health Care Institute, show that one-third to one-half of the American patients is non-adherent (Khan, 2012).

The degree of non-adherence of patients suffering from chronic illnesses in developed countries on long term treatment is around 50%. It is expected that degree

in the developing countries might be higher (WHO, 2011). Another study reports that whereas patients with heart disease who adhere to medications properly only 7% die from the disease but for those who fail to take medications the death rate is 12%. Additionally, study show the degree of non-adherence ranked between 16.7 and 80% in patients sick from tuberculosis, asthma, epilepsy, and congestive cardiac failure (Loghman, 2003).

Non-compliance is believed to be the most common cause of treatment failure. Moreover, studies show compliance is about 50% for medications in chronic diseases. The consequences of medication non-compliance may not only be dangerous for patients' health, but also dramatically increase the financial cost of public health services (Santhanakrishnan, Lakshminarayanan & Kar, 2014).

It has been observed and reported that failure of high blood pressure treatment is a widespread problem showing intentional choice by the patient who view hypertension as a disease process. This has caused increase of hypertension cases despite having anti-hypertension medications and strategies for managing disease. . (Anthony et. al., 2012).

Whereas the degree of adherence to short-term treatment was much greater at between 70% and 80%, adherence to lifestyle modification was the lowermost at 20%-30% (Jin et al., 2008). And study reported that the compliance of patients with drug treatment varied between 50% and 70% (Sabaté 2003).

Non-adherence in chronic disease has been described as taking less than 80% of the prescribed treatment (Iswarya et al., 2014). This low compliance to treatment regimens is a complex problem, particularly for those with chronic illness, and is significantly undermining the benefits of medical care. This leads to uncontrolled hypertension caused by non-adherence to the antihypertensive drugs (Mahrous, 2015;

Joho, 2012). Besides, compliance is a key concept in health care and affects all areas of health care including. Non-compliance has previously been a label attached to many patients without much thought having been given to the causes of poor compliance (Chatterjee, 2006).

The level of compliance to drug treatment and lifestyle changes showed that the treatment adherence was 53% (Mahrous, 2015). The findings are in agreement with a research conducted at Civil Hospital, Karachi which established that 54% of patients suffering from hypertension had good medication compliance (Naeem, 2012). These studies are supported Alas and other researchers who state that 57% of hypertensive patients were adhering to antihypertensive regimen (Almas et al., 2006). Whereas the findings of and others show that 48.3% of patients affected by hypertension complied to hypertensive regimen, 51.7% were not complying to the medication treatment (Nasir et al., 2008).

Study shows that Soudi Arabia had higher rate of non-compliance with medication than the previous results in Uganda, Hong Kong, Palestine, Mexico and Soudia Arabia which was established to be 28.9, 59, 51.4 61, and 65 % (average) respectively that was lower than Indian which had 75%. Furthermore, study in palestine categorized non-compliance as poor compliance as 51.4% and non-compliance as 6.5% (Khan et al., 2012).

Effects of Non-Compliance

Study show that one third of hospital bed occupants for heart failure patients were due to non-compliance with regimen for both medication and dietary. Non-adherence with both lifestyle modification and pharmacological regimen were the main health problem when dealing with chronic diseases. Besides, Moreover, notwithstanding the effort made to control hypertension through the publications,

hypertension treatment guidelines both for doctors and lifestyle modifications recommendations for patients, hypertension control rates are still high (Svetkey et al., 2009).

Patient non-compliance is a serious healthcare concern that poses a great challenge to the successful delivery of healthcare. This is widespread and has been reported from all over the world (Khan, 2012). Poor adherence to long-term therapies severely compromises the effectiveness of treatment making this a critical issue in population health both from the perspective of quality of life and of health economics (Blanca et al., 2001).

The non-compliant patients especially with chronic diseases are more prone to encountering serious difficulties (Khan, 2012). Non-compliance is believed to be the most common cause of treatment failure. Non-compliance leads to lack of metabolic control, which contributes to development and acceleration of diabetic complications ((Santhanakrishnan, Lakshminarayanan, & Kar, 2014).

Besides undesirable impact on clinical outcomes, non-compliance would also cause an increased financial burden for society. For example, therapeutic non-compliance has been associated with excess urgent care visits, hospitalizations and higher treatment costs (Jing et al., 2008).

From the perspective of healthcare providers, therapeutic compliance is a major clinical issue for two reasons. Firstly, non-compliance could have a major effect on treatment outcomes and direct clinical consequences. Non-compliance is directly associated with poor treatment outcomes in patients with epilepsy, AIDS (acquired immunodeficiency syndrome), asthma, tuberculosis, hypertension, and organ transplants. In hypertensive patients, poor compliance with therapy is the most important reason for poorly controlled blood pressure, thus increasing the risk of

stroke, myocardial infarction, and renal impairment markedly (Jing, *et al*, 2008). Correspondingly, non-compliance is believed to be the most common cause of treatment failure. Non-compliance leads to lack of metabolic control, which contributes to development and acceleration of diabetic complications ((Santhanakrishnan, Lakshminarayanan, & Kar, 2014).

Effects of Non-compliance among Hypertensive Patients

The poor control of high blood pressure is attributed to poor compliance with the treatment regime (Awad et al., 2015). Uncontrolled hypertension is caused by non-adherence to the antihypertensive drugs. Therefore, requires patients understanding of their drug regimens so as to help improve their adherence. This will help prevent the complications of hypertension which are debilitating and if not prevented can increase the burden of a disease that is already on the increase (Kumar & Halesh, 2010).

Correspondingly, adopting lifestyle modifications or noncompliance with prescribed medications can also be associated with uncontrolled hypertension as well as the risks of developing complications (Campbell, et al, 2006). Compliance with antihypertensive drug therapy (AHT) has been shown to reduce the risk of stroke and coronary heart disease by an estimate of 34% and 21%, respectively (Law et al., 2003).

Moreover, it has been shown that in many countries poorly controlled blood pressure represents an important economic burden (e.g. in the United States the cost of health care related to hypertension and its complications was 12.6% of total expenditure on health care in 1998) (Hodgson & Cai, 2001).

Uncontrolled hypertension is caused by non adherence to the antihypertensive drugs; Poor adherence compromises the effectiveness of treatment making this a

critical issue in population health both from the perspective of quality of life and of health economics (WHO, 2003). The complications of uncontrolled hypertension are cerebrovascular, cardiovascular and kidney disease (Wolz *et al.*, 2000). When those complications arise patients end up in ICU leading to increased work load to both critical care nurses and doctors. Those patients in critical condition especially with myocardial infarction or stroke stay longer in ICU causing increased cost of hospitalization. This has a poor outcome to their quality of life as it may cause permanent disability or death which increasing the burden to their family, community and nation as a whole (Joho, 2012).

Lifestyle Modification in Hypertension

Lifestyle modification compliance among hypertensive patients was 35.1% (Mahmoud, 2012). Others studies have shown adherence rates of high potassium intake can be ac% for diet but only 19% for exercise; while adherence for medications use was higher than for lifestyle changes (Harris, 2007).

Factors Influencing Compliance and Non-Compliance

Studies show that barriers to blood pressure control exist at the patient, physician, and system levels. Therefore, the need for interventions that target patient- and physician-related barriers, such as patient education, home blood pressure monitoring, and computerized decision-support systems for physicians (Odedosu *et al.*, 2012). To improve adherence, it is important to know the factors which influences non-adherence (Mumu *et al.*, 2014). Therefore, the need for understanding the factors of non-adherence to life-style changes which can help to plan and implement more intensive interventions to assist patients' long-term task of achieving beneficial life-style changes (Mumu *et al.*, 2014).

Factors Affecting Non-compliance

Non-compliance can be due to factors that are patient-centered, therapy-related, or healthcare system – related. The patient-centered factors can be demographic (age, gender, educational level, and marital status) and psychological (patients' beliefs and motivation towards the therapy, negative attitude, patient-prescriber relationship, understanding of health issues, and patient's knowledge). The therapy-related factors include route of medication, duration of treatment, complexity of treatment, and the side effects of the medicines. The factors associated with the healthcare system include availability, accessibility, and the physician (Khan et al., 2012). (Jansiraninatarajan, 2013)

Moreover, it has been reported that non-adherence can be unintentional (such as forgetting) or can be intentional, whereby patients make a decision not to take treatment based on their personal beliefs about their illness and treatment (Hashmi et al., 2007).

A study done by Aga Khan University Pakistan on influence of compliance to antihypertensive treatment shows that non-adherence was due to side effects of drug, inadequate, forgetfulness, cost issue, increased number of tablets and deliberately missing doses (Almas et al., 2006) . Further, these factors can be classified into different categories which include: patient- centered factors such as “e.g. age, gender, education, ethnicity, and marital status, therapy-related factors, healthcare system factors, social and economic factors, and disease factors” (Jing et al., 2008).

The study clarified that the major factor contributing to barriers to adherence to diet were unwillingness (48.6%), difficulty adhering to a diet different from that of the rest of the family (30.2%), and social gatherings (13.7%). The main barriers to adherence to exercise were lack of time (39.0%), coexisting diseases (35.6%), and

adverse weather conditions (27.8%). And factors interfering with adherence to lifestyle measures among the total sample were traditional Kuwaiti food, which was high in fat and calories (79.9%), stress (70.7%), a high consumption of fast food (54.5%), high frequency of social gatherings (59.6%), abundance of maids (54.1%), and excessive use of cars (83.8%) (Maleka et al., 2007).

For instance, a study among hypertensive patients on Praslín Island found out that individual perception of the benefits and risks of hypertension treatment as well as indications to action were found to be significant determinants of compliance behavior. The study tinted the need for improved health education and follow-up measures to strengthen patients' perceptions about the benefits of treatment and compliance (Edo, 2009). Equally a study in Nigeria found out that majority of respondents (92.2%) had poor knowledge of the benefits of exercise, weight loss and a healthy diet (Okonta, Ikombele, & Ogunbanjo, 2014).

Likewise, it has been reported that level of knowledge on causes, complications, and treatment often impact on -psychological, social and Compliance to treatment regimen-diet and nutrition, exercise, medications, self-monitoring and follow-up which contributed to non-compliance to lifestyle modifications (Jansiraninatarajan, 2013). There are many factors that may influence this poor adherence among diabetic patients. The factors such as age, duration of disease, lack of communicative relationship between the patient and health care providers, health beliefs and perceptions that are incompatible with the recommendations and socio-economic factors (Mumu et al., 2014).

Furthermore, there was a significant rural–urban difference in the non-compliance rate among the diabetic patients in a study by Khan. The non-compliance in the urban population was significantly higher than the rural population. The same

finding has been documented in the Palestine study where the non-compliance among urban diabetic patients was higher than among the rural patients. This difference may be due to various lifestyles. Urban residents tend to be more sedentary with relatively poor dietary habits as compared to the rural population (Khan et al., 2012).

Correspondingly, a study by Osamo in Nigeria shows the reasons for non-compliance of the modification was that the respondents believed hypertension is curable with the use of both orthodox and traditional medicines and that a patient who felt better could stop using antihypertensive medication. The study further expounded that some patients justify their non-adherence to dietary recommendations on the basis of criticism by others, lack of information, unwillingness, and lack of support from spouse and/ or family, negative health beliefs and perceptions, previous experience with chronic disease and financial problems (Osamo, 2011).

Many factors affect the patients' compliance, these may be either related to demographic feature of the patients such as age, sex, level of education, occupation, family size, monthly income, residence, family history and duration of illness (Awad et al., 2015). Another study has reported that factors that affected patients' compliance were their sex, level of education, work status, smoking habits, self-reported response to medications and their perception of hypertension ((Divya & Nadig, 2015).

Socio-Cultural Factors Influencing Compliance

Studies show that economic status influence compliance level among the respondents. The study reveal that the upper middle class respondents had a higher compliance level than the lower class respondents. Besides, the findings showed that the repondents nearer to the health care facility adhered better to dietary advice than

those far away from the hospital and the difference was statistically significant (Parajuli et al., 2014).

A study in Kuwait reported that several further factors hinders diet compliance among Kuwait patients. For example, regular meetings with families and friends are frequent matter. During this periods patients eat more sugar, fat, meat, wheat flour plus rice than before. Further, the climate in Kuwait is similar as that of dry desert extremely hot summer with a short-cool Winters which usually discourages patients to engage in physical activity (Serour, 2007).

Moreover, other studies have clearly shown that factors like illiteracy, inadequate fund to buy medications, failure to know the benefits of regularly taking drugs, inadequate knowledge on the prescribed drugs, not seeing the physician frequently and failing to keep advice on taking nutritious diet are the mainfactors influencing non-compliance (Divya & Nadig 2015). Besides, gender, education level, cultural beliefs and lifestyle influence lifestyle modification among patients with hypertension there were significant rural-urban differences in non-adherence rate among patients, and females were significantly compliant (34.55 vs. 30.66%, $P = .003$) (Khan et al., 2012) (34.55 vs. 30.66%, $P = .003$) (Khan et al., 2012).

Correspondingly, studies have shown that different factors influence patients' adherence with ant-hypertension medications. Research by Bovet discovered that compliance was fairly high in patients with trained occupations, those who impressed health behaviors and those who honored their clinic appointments. Patients with expertise employment are able to recognize the benefit to adhere with medications and while those patients who are knowledgeable about health were likely to keep clinic appointments and ensure compliance with treatment (Bovet et al., 2002).

Attitude of patients too influence their personality to compliance behavior. For instance, one study discovered behaviors such as denial, carelessness and hopelessness lead significantly to drug non-adherence. Whereas uncaring patients are more likely to avoid drugs for some times, patients with hopelessness will surely not see any advantage of taking their drugs. Moreover, a patient who refuses of suffering from hypertension will not care to take drugs (Edo, 2009).

Moreover, reports show that psychosocial factors like depression and measure of social support promote compliance behaviors. psychosocial factors such as depression and level of social support influence compliance behaviour. Disheartened patients may be unhappy with life and lose appetite for either food or drugs consequently be repressed (Wang et al., 2002). Consequently, societal provision that has financial or logistical aid is expected to strengthen compliance especially in old and disabled patients. Besides, other factors like socio-demographic factors, self-efficacy, health care related factor and cues to action likewise have been discovered to influence compliance actions. (Edo, 2009).

Moreover, a study done at Kenyatta National Hospital shows that aspects that have been discovered to negatively influence compliance to intake of drugs are difficulty of treatment, drug side effects, depression plus inadequate patient's belief in the instant and future advantages of the prescribed drugs (Omari, 2013). In addition, another study reported that the major barrier to compliance was the patients' attitude that it is important. The main barrier to adherence to blood glucose monitoring was that patients did not feel it is important, whereas hindrances to physical activity were patients' busy schedule, laziness and living with a disease. (Mumu *et al.*, 2014).

Consequently, studies have concluded that the socio-demographic characteristics such as age, gender, educational level, family size, income and duration of illness had an effect on the degree of compliance. The main contributing factors were age and duration of illness which in turn negatively affect their quality of life particularly as regard domains of physical function, role limitation due to physical problems and role limitation due to emotional problems (Awad et al., 2015).

Limited income with drug cost, or multiple drug intake will probably affect compliance. This may explain the result of the present study which revealed significant difference between compliance and monthly income of hypertensive patients (Edo, 2009). This result is supported by further research done in Saudi Arabia and Sudan that discovered that low income can lead to non-compliance especially in the medication the patient is taking is expensive or if the patient is taking more than two drugs. (Gwadry-Sridhar, 2013). In contrast by further research conducted in Alexandria on patients affected by hypertension showed that there was no significance difference between adherence and monthly income of hypertensive patients (Awad et al., 2015).

Level of Compliance and Non-Compliance to Lifestyle Modification

Life style modification is one of the factors that has been introduced by the Public health departments globally in order to reduce the prevalence and as well help the hypertensive patients to live better lives even though they are suffering from hypertension (Mayo Clinic, 2015). Though a number of lifestyle medications have been suggested, these life style changes compliance is a major setback in the fight against hypertension (Mohan et al., 2007). Lifestyle changes supposed to be significant in the treatment of high blood pressure from the very beginning when it is

diagnosed with or without starting antihypertensive medication (Neutel & Campbell, 2008).

Nevertheless, adherence with lifestyle modification is always undesired more so in third world countries (Harris, 2007). Moreover, in Kenya, reports show that 41% of patients are unwilling to adopt healthier lifestyles (GoK, 2013). Hence, is a major setback in the fight against hypertension (Mohan et al., 2007). Consequently, many lives have been lost due to lack of compliance to lifestyle modifications among hypertensive patients (Harris, 2007).

Study findings reports compliance to recommendations to treatment in Pakistan which comprised smoking, diet, home-blood measurement and exercise were 63%, 72% ,31% and 65%, respectively. Further, showed that whereas one patient adhered to one recommendation, 11% of patients complied at least one recommendation, 23%-to two, 29%-to three, 24%- to four and 13%- to five diet regimen, 64.4% (Kardiyol, 2009). Correspondingly, a study carried out in Kuwait about lifestyle measures that among the respondents reported that 64.4% did not engage in physical activity, 63.5% did not adhere to food regimen and 90.4% were overweight and obese (Seour et al., 2007).

Health Service Factors Influencing Compliance

Findings from this study showed that patients who were educated had easy time following dietary recommendations, physical activity and leaving smoking habit than those patients who never attended any class. Another study done Hungary revealed similar results d that patients who attended their GP every month were able to follow the diet recommendation correctly (Mumu et al., 2014).

Study by Khan (2012) revealed that a good relationship between a patient and physician has been recognized as beneficial factor influencing compliance among

patients. Consequently this research found out that adherence was better among sufficiently informed patients concerning drug dosage, period of action and the related side effects of the medications . However, patients who had no sufficient information on how to react when they have missed their dosage or if they had any side effects of the drug, were more non-compliance (Khan, 2012).

Non-compliance to intake of drugs is caused by insufficient knowledge about benefits of of compliance in the management of hypertension. Consequently, there is need to advance compliance through health care structure and health education to both patients and families (Divya & Nadig, 2015).

Study findings shows that adequate patients-physician relationship was ranked at 144.4% of patients who had fair-to-good adherence and 83.0% of patients with co-morbidity and had low compliance (Divya & Nadig, 2015). Therefore, studies have agreed that the development of an effective communication skills when counseling diabetic patients is very important rather than only focusing on providing services, patient education through increasing knowledge, building positive attitudes, monitoring patients' compliance to glycemic control, encouraging adherence to self-care behaviors as well as dietary and lifestyle modifications which should be emphasized to diabetic patients at every appointment (Hamid, 2012; Nasir et al., 2008).

CHAPTER THREE

RESEARCH METHODOLOGY

This section discusses the research design used in this research and also provides a general outline for this study. It present details of the research design, study population, sample and sampling techniques (procedures), description of research instruments, validity and reliability of instruments, data collection procedures, data analysis techniques and ethical considerations while conducting the study

Research Design

Research design is a systematic plan to study a scientific problem. A descriptive-correlational research design was used in this study to investigate the factors that influence compliance to lifestyle modification among hypertensive patients. Descriptive design was permitted to deeply explore and describe the phenomena associated with characters of a subject population (Cohen, Manion, & Morrison, 2011), but correlational design allowed the researcher to establish which factors that are associated with compliance to lifestyle modification.

A correlational study design determines whether or not two variables are correlated. This means to study whether an increase or decrease in one independent variable (individual, family, health services, social cultural factors) corresponds to an increase or decrease in the other dependent variable (compliance to the lifestyle modifications).

Population and Sampling Techniques

The study population was hypertensive patients who regularly attend special clinic at Nyamira County Referral Hospital. These patients were 224 total in number who voluntarily participated in this study.

Inclusion Criteria

All the hypertensive patients attending the outpatient special clinics at Nyamira County Referral Hospital present and willing to participate at the time of data collection were involved in the study. The study included all hypertensive patients who had come during the month of May 2017 whether they had come for the first time to the clinic or for subsequent appointment visit.

Exclusion Criteria

This study excluded patients with different condition apart from hypertension and those hospitalized having hypertension.

Sample Size Determination

The sample size comprised of all the hypertensive patients attending the special clinics in Nyamira County Referral Hospital. The expected number was 224 hypertensive patients that averagely attend the special clinic in one month. Therefore, a census study was done on all the 224 hypertensive patients who attended the special clinics at Nyamira County Referral Hospital in the month of May, 2017. Therefore; the response rate was 100%.

Sampling Technique

The study used purposive sampling technique to include all the 224 hypertensive patients attending special clinic at Nyamira County Referral Hospital as respondents of this study. Besides, it used the convenience sampling technique to get the 224 hypertensive patients who were attending the clinic during the month of May, 2017.

Research Instruments

The study employed self-administered structured questionnaires. The instrument used was developed by the researcher in consultation with the research

advisors. The questionnaire developed was submitted to the research advisers for the content validation and any recommendation from the advisors was incorporated to the study questionnaire. The guiding principle used to develop questionnaires was based on the variables of choice by the researcher and the supervisors. Literature was also used to develop the questionnaire. The questionnaire was based on a modified Likert scale by the researcher in consultation with the supervisors.

Pilot Study

A pilot study was conducted in Kisii County Referral Hospital using a sample size of 30. This was done so as to test for the reliability of the instruments used in data collection. Cronbach's alpha greater than or equals 0.7 is acceptable. After pilot study data analysis, one of the items in family factors was deleted so that its reliability could improve to significant level. The reliability figure on compliance is 0.911, social cultural factors is 0.83, individual factors is 0.94, on family factors the reliability figure is 0.482, and health factors is 0.849.

Data Gathering Procedures

The researcher got an introductory letter from the office of the graduate studies, University of Eastern Africa, Baraton to take it to Kisii County referral and training hospital. The Kisii hospital training committee allowed the researcher to collect data from hypertensive patients attending special clinic by giving approval letter written by the training officer of the hospital. The Nurse in-charge of the special clinic permitted the researcher and his two assistants to administer the questionnaires to the hypertensive patients as they lined up to see the doctor. All the questionnaires were collected immediately as they were filled for analysis and for testing of reliability.

The researcher sought approval from both the Institutional Research Ethics Committee (IREC) and office of the graduate studies which granted him approval and introductory letters respectively to collect data. The researcher also obtained permission from Medical Superintendent and special clinic in-charge of the Nyamira County Referral Hospital to gather data in the hospital. To effectively complete data gathering in time, the researcher trained four nurses to assist him in distributing questionnaires and collect them from all willing hypertensive patients seeking treatment at the clinic.

The researcher approached every hypertensive patient who attended special clinic at Nyamira County referral hospital outside the clinic's office as they waited to be seen by their doctor. He explained the purpose of the study and then requested them to give informed consent by signing the consent form and voluntary participation was sought. The questionnaires were administered to every patient by the researcher and his assistants. The selected respondents were requested to fill the questionnaire; if the hypertensive patient was illiterate, they were then assisted by their caregivers accompanying them or the research assistant in filling in the questionnaire. .

Since the investigator was not able to reach the targeted population of 224 hypertensive patients in the Out Patient Department register, the researcher opted to include other new patients who were not previously in the Out Patient Department register to reach his target. The questionnaires were collected by the researcher immediately they were filled by the respondents. This exercise was completed within one month and a half.

Statistical Treatment of Data

Descriptive statistics using mean and standard deviation for continuous data and frequencies for categorical data; were used to describe the findings of the study. In addition, Pearson product moment coefficient was used to find out the relationship between the dependent and independent variables. Finally, multiple regression analysis was used to find out the best predictors among the independent variables hypothesized and associated with the dependent variable.

Ethical Considerations

The researcher sought approval from the institutional research ethics committee (IREC) of the University of Eastern Africa, Baraton. The Medical Director and hospital administrator of Nyamira County Referral Hospital was requested for permission to carry out the study in their institution. The researcher also sought the consent of the hypertensive patients attending the special clinics by explaining the purpose of the study to the patients and asked them to give informed consent if willing to voluntarily participate in the study. The study participants were interviewed or were given the questionnaires to fill them on their own and these questionnaires were collected back after being filled.

Confidentiality was guaranteed by asking the respondents not to write their names on the questionnaires to ensure anonymity. In addition, all personal information from participants obtained from the study was or will not be used to victimize the individuals. Moreover, participants were not required to reveal their identity since the questionnaires was identified using codes. The information collected was kept private in the department of public health of UEAB

The study respected the rights of the respondents by allowed them to participate both independently and voluntarily after ensuring that they had full

knowledge about the study. The respondents were free to withdraw from the study anytime without any penalty.

The privacy of the respondents and the possible harm that the results of the study would cause was guaranteed. All respondents who voluntarily participated in the study were explained on the benefits of the study.

CHAPTER FOUR

PRESENTATION OF FINDINGS DATA ANALYSIS AND INTERPRETATION

This chapter presents the study findings on factors that influence the lifestyle modification compliance among hypertensive patients in this study. The presentation of the findings follows the sequence of the research questions as presented in chapter one of the study. The analysis includes use of descriptive, correlational and regression analysis.

Demographic Profile of Respondents

Age of Respondents

From figure 3, it is clear that out of 224 patients who participated in the study, 2.7% were between the age of 18-28 years, 9.8 % were between the age of 29-39 years, 29.5 % were between the age of 40-50 years, 35.7% of the respondents age felt between the age bracket of 51-62 years and 22.3% were above 63 years of age. This shows that most of the respondents who are hypertensive are between the ages of 51-62 years. The most affected group is cumulatively 40-62 years, which represent 60.2% of the total sample

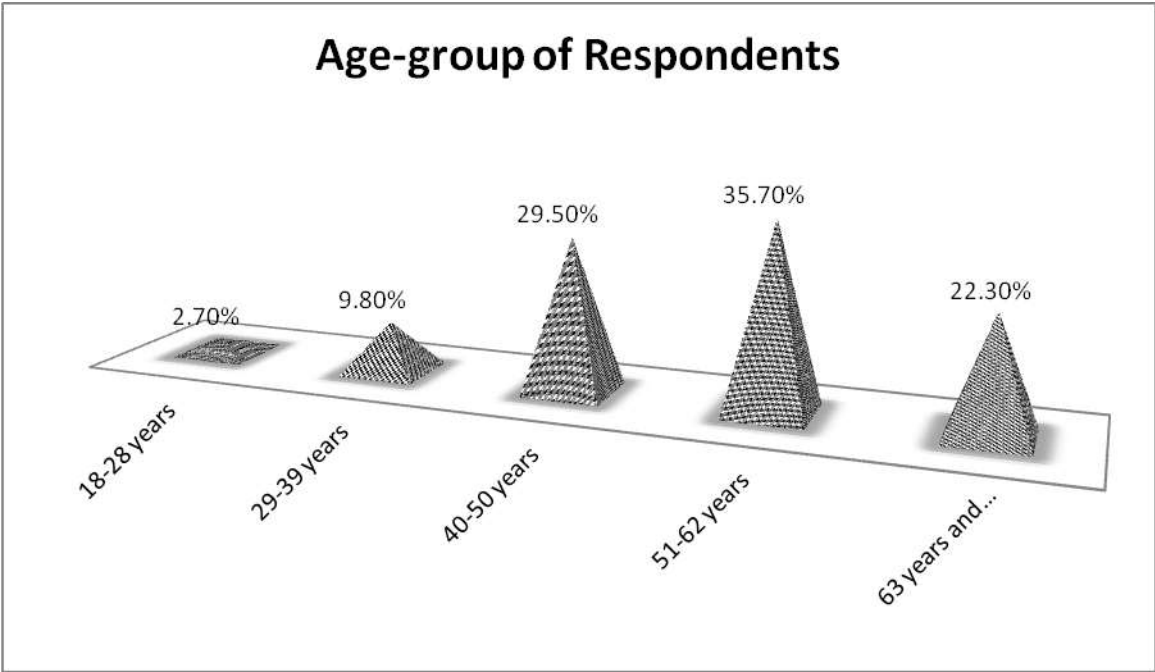


Figure 4. Showing age of respondents.

Sex

The present research also wanted to know the respondents sex. This is very important because the study will reveal which is most affected than the other. From figure 5, it is evident that 48.7 % of the hypertensive patients who attended the clinic are male and 51.3% are female, this shows that both male and female are almost equally affected.

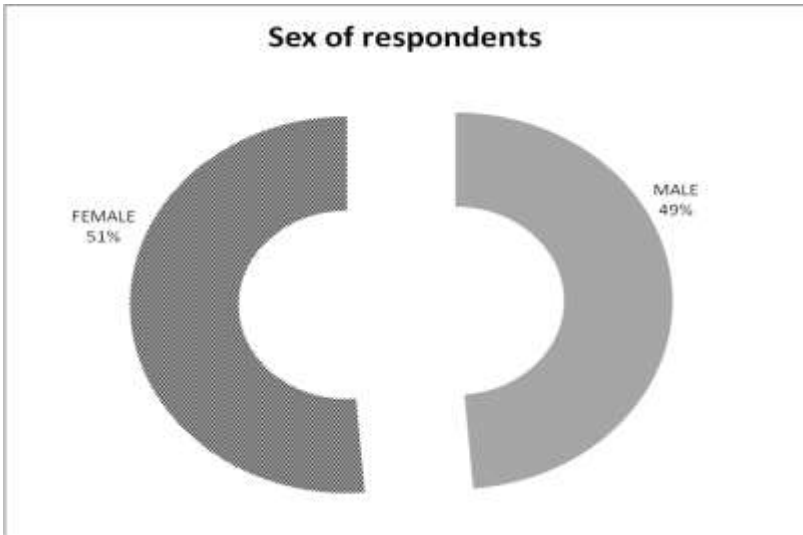


Figure 5. Showing sex of respondents.

Marital Status

Figure 6 shows that majority of respondents (80.8 %) were married, 5.8 % of the sampled respondents were single, 3.6 % were divorced, and 9.8 % were separated at the time of the study with least being divorced (4%).

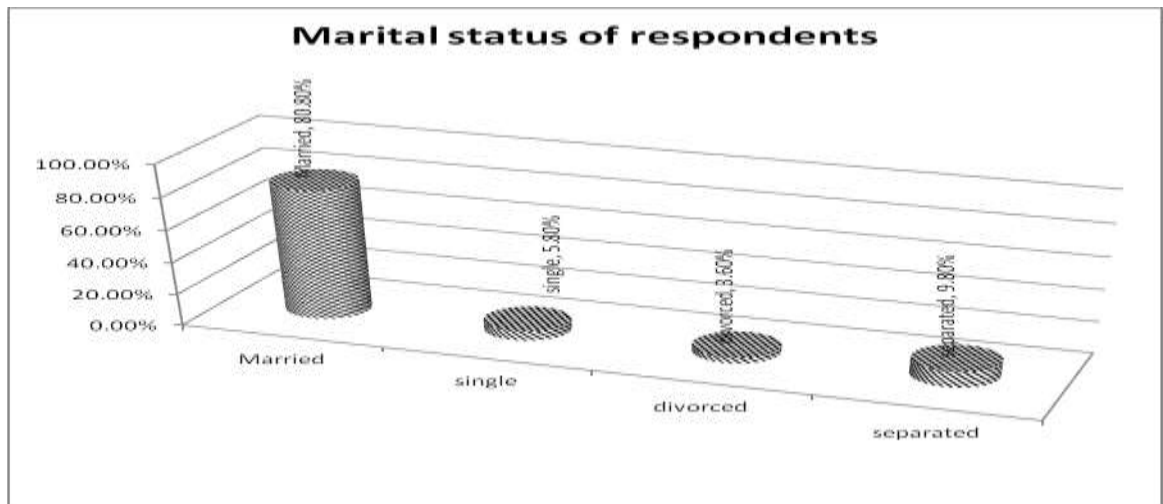


Figure 6. Showing the marital status of respondents.

Level of Education

The study revealed that 22.3 % of the respondents had attained primary school as their highest level of education, 50.4% were secondary school leavers, 26.3% were college/university leavers and other were represented by only 0.9% this shows the most of the hypertensive patients in Nyamira County are have their highest level of education as high school.

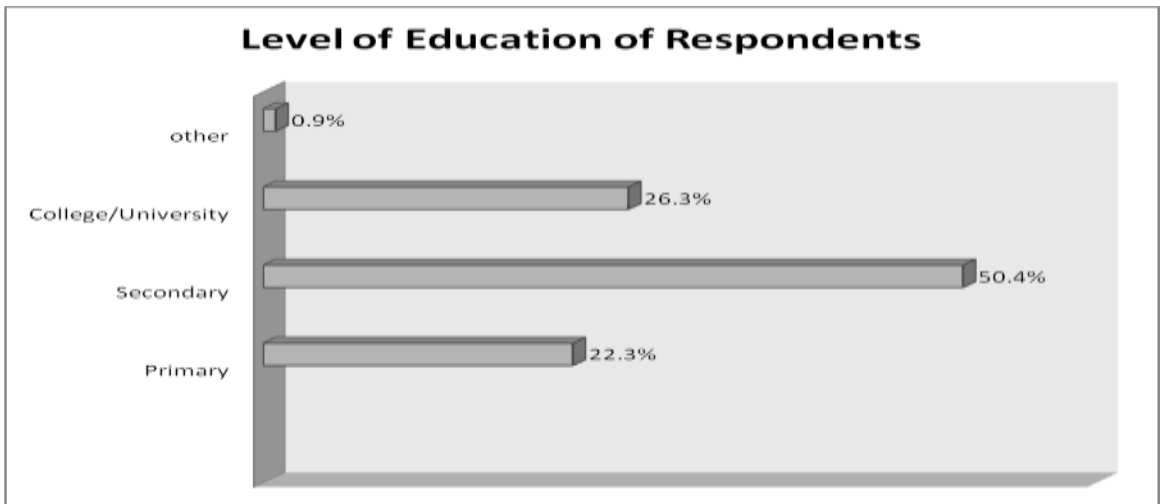


Figure 7. Showing level of education of respondents.

Occupation

Over a third of the hypertensive patients in Nyamira County are self-employed, 41.1% (figure 8), followed by those who are not employed, representing 39.3% and the least affected group are the employed group, in which out 224 sampled hypertensive patients, only 19.6% were employed. This suggest that most of those who are suffering from hypertension condition are self-employed and those who are not employed.

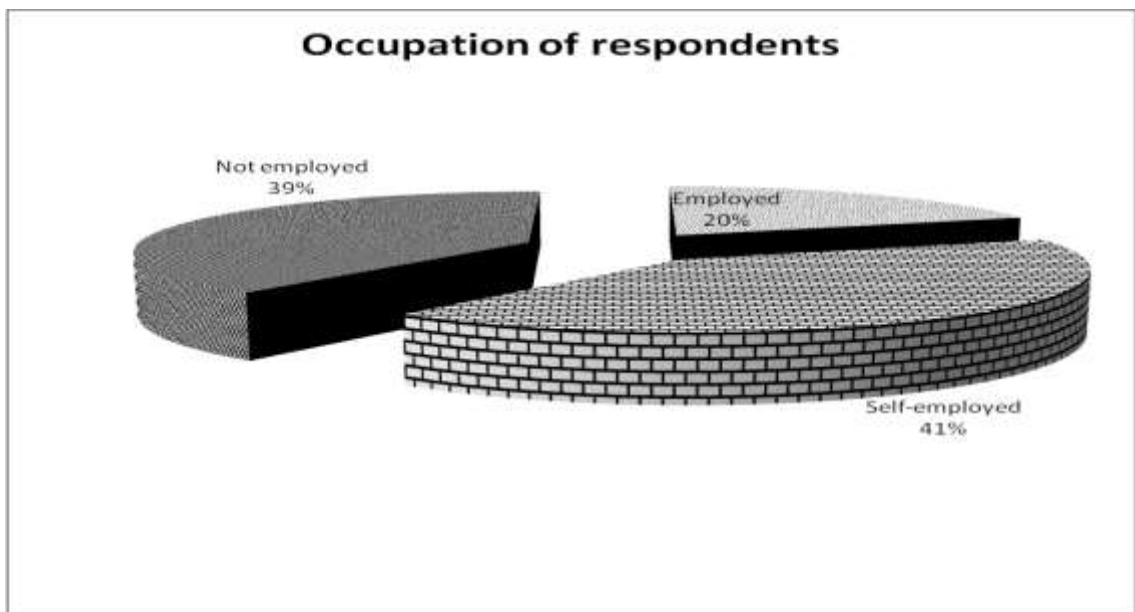


Figure 8. Showing the occupation of respondents.

Residence

Most of those who are hypertensive are reside in rural areas. Among 224 sampled respondents during the study, 66.5% reside in rural areas, 26.5% reside in urban areas while 6.7% reside in both rural and urban areas.

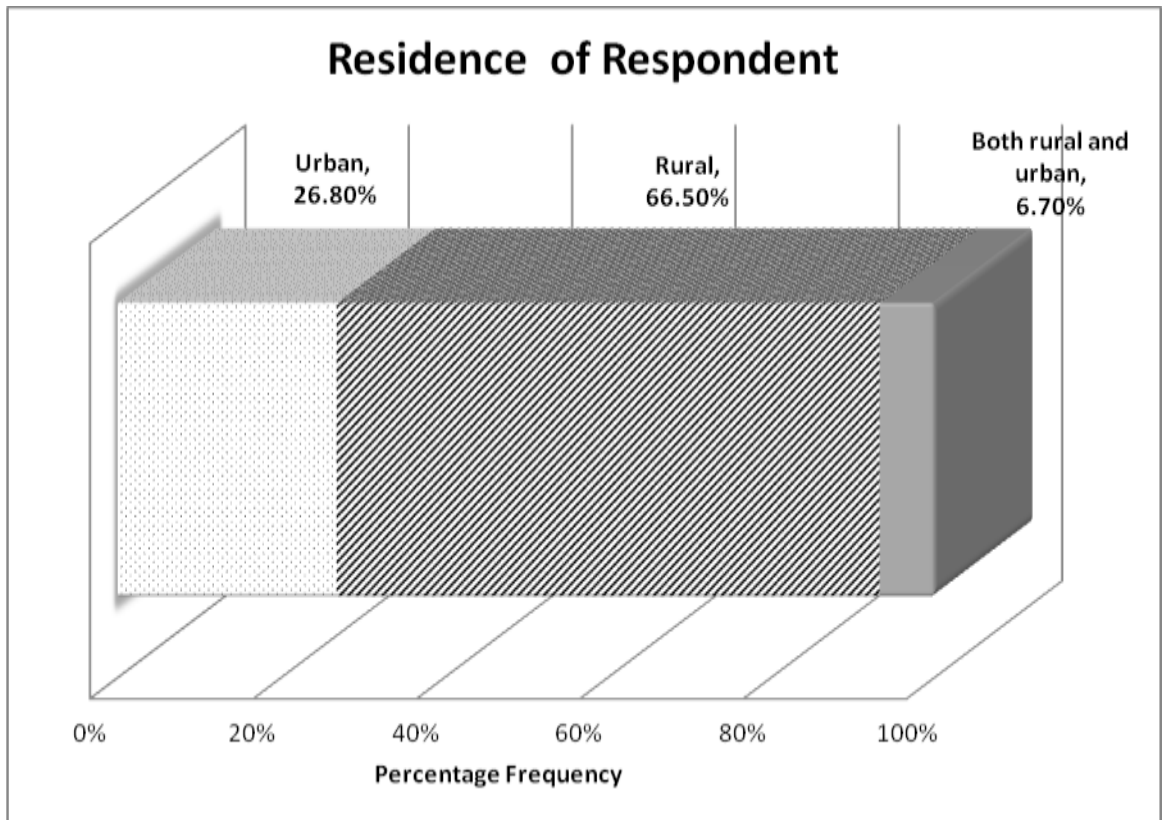


Figure 9. Showing residence of respondents.

Most of those who are hypertensive are reside in rural areas. Among 224 sampled respondents during the study, 66.5% reside in rural areas, 26.5% reside in urban areas while 6.7% reside in both rural and urban areas.

Level of Compliance to Lifestyle Modification among Hypertensive Patients Attending the Special Clinics in Nyamira County Referral Hospital

The following scale of interpretation of the mean was used:

- 1.00 – 1.49 Strongly Disagree/Low level
- 1.50 – 2.49 Disagree/Below average level
- 2.50 – 3.49 Agree/Average level
- 3.50 – 4.00 Strongly Agree/High level

Table 2

Level of Compliance to Lifestyle Modification

	Mean	Std. Deviation
I do regular exercises as advised by the doctor	2.23	.975
I take the prescribed diet as per my doctors advise	2.27	.868
I avoid taking harmful substances such as alcohol and tobacco as advised by my physician	2.87	.763
I know how to manage my stress	2.13	.933
I always keep doctor’s appointments	2.93	.730
I always follow the advice of my spouse on diet, exercise etc	2.34	.998
I buy all the required diet and medication as per the doctor’s advice	2.21	1.005
I always keep my doctors dietary advice even if I am in a party or wedding.	2.43	1.013
COMPLIANCE	2.4258	.55550
N = 224		

The present study sought to know the level of compliance to lifestyle modifications among hypertensive patients who were attending special clinic at Nyamira County hospital in Kenya. The study after data analysis shows that the patients disagreed that they do regular exercises as advised by the doctor (mean,

2.23), and also disagreed that take the prescribed diet as per doctors advise (mean, 2.27), however they agreed that they avoid taking harmful substances such as alcohol and tobacco as advised by physician (mean, 2.87), they disagreed that they know how to manage my stress, mean, 2.13, and agreed that they always keep doctor's appointments, mean 2.93. In addition, the hypertensive patients disagreed that they always follow the advice of the spouse on diet, exercise etc (mean, 2.34), disagreed that they buy all the required diet and medication as per the doctor's advice with a mean score of 2.21, and as well disagreed that they always keep their doctors dietary advice even if they are in a party or wedding with a mean rating of 2.43.

Further analysis was done by computing the value for each option used to assess the compliance level among hypertensive patients. The figure below shows that most of the respondents (80%) were non-compliant and only 20% were compliant to the lifestyle modifications recommended.

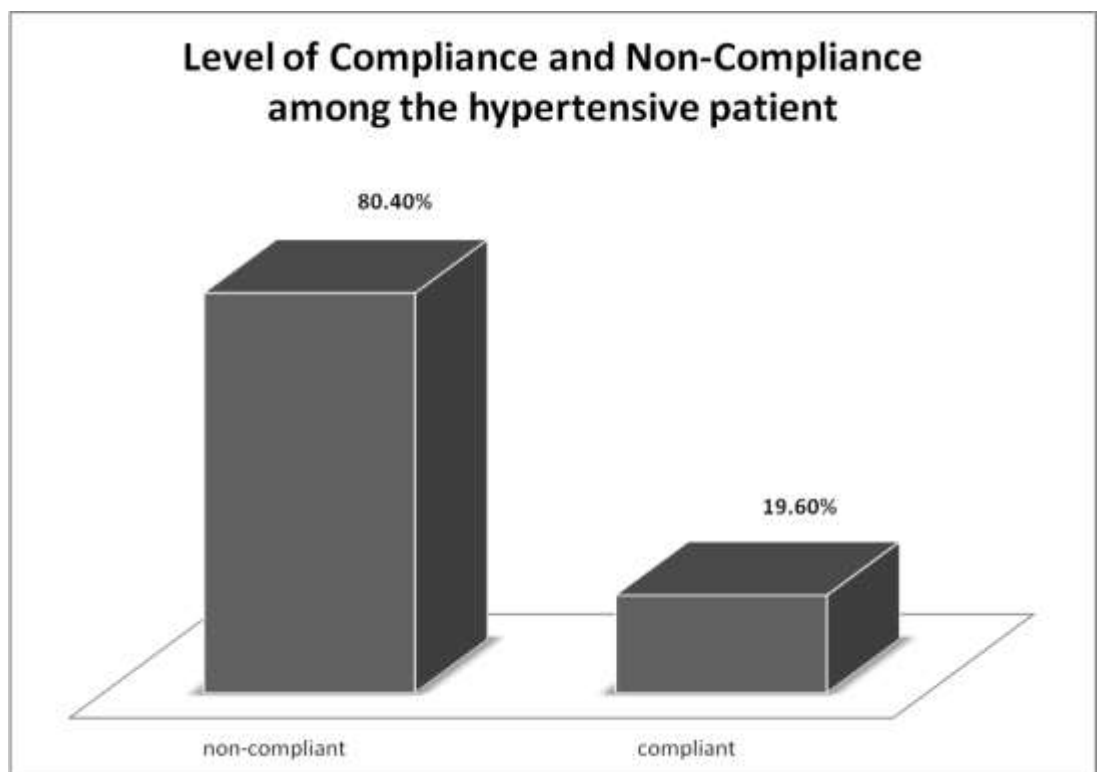


Figure 10. Showing level of compliance and non-compliance.

Therefore, both analysis show that the patient's lifestyle compliance is below average. Similarly, studies show that adherence of about 50% for medications in chronic diseases including hypertension and much lower for lifestyle prescriptions (Blanca, et al, 2001; Benner et al., 2002; WHO, 2011; Santhanakrishnan, Lakshminarayanan & Kar, 2014). Moreover, according to a study by the New England Health Care Institute, one-third to one-half of the American patients is non-compliant (Khan, 2012). Similarly, studies have shown that compliance with lifestyle changes was the lowest at 20%–30% (Jin et al., 2008).

Evaluation of Personal Factors and Health Service Factors Among Hypertensive Patients Attending Special Clinic in Nyamira County

Referral Hospital

- a. Socio- cultural factors
- b. Individual factors
- c. Family factors
- d. Health service factors

The following scale of interpretation of the mean was used:

1.00 – 1.49	Strongly Disagree/Low rating
1.50 – 2.49	Disagree/Below average rating
2.50 – 3.49	Agree/Average rating
3.50 – 4.00	Strongly Agree/High rating

Table 3 shows the findings analyzed using descriptive statistics, it is unblemished that the patients agreed that they do not like doing exercise in public with a mean rating of 2.76, but disagreed that friends laugh at them when performing physical exercises with a mean rating of 2.38, they also agreed that there is no enough

space to perform physical exercise in their house or compound with a mean rating of 2.5. Furthermore, they agreed that they avoid public matters that influence their health e.g politics (mean, 2.70), moreover, they agreed that they avoid any social gathering that influence their health status negatively (mean, 2.64), they rated average with a mean rating of 2.70 that have been advised to avoid certain food(s), there is/are type(s) of food or drink(s) they cannot leave when in a party or ceremonies. Respondents further agreed that they use the kind of transport that helps them to improve their health e.g walking, cycling with a mean rating of 2.60. The patients disagreed that they are criticized by their friends when they follow doctors' advice to

Table 4.

Socio- cultural Factors

	Mean	Std. Deviation
*I don't like doing exercise in public	2.76	1.012
*My friends laugh at me when performing physical exercises	2.38	.906
*There is no enough space to perform physical exercise in my house or my compound	2.50	.847
*I avoid public matters that influence my health e.g politics	2.70	.876
*I avoid any social gathering that influence my health status negatively	2.64	.992
*Though have been advised to avoid certain food(s), there is/are type(s) of food or drink(s) I cannot leave when in a party or ceremonies	2.70	1.138
I use the kind of transport that helps me to improve my health e.g walking, cycling.	2.60	.974
*I am criticized by my friends when I follow doctors' advice to improve my health	2.38	1.022
I can afford to buy all the food and as well pay for my doctor services	2.07	.972
*I avoid my friends during my regular physical exercise	2.53	.988
*My friends see my regular exercise as shame	2.46	1.045
SOCIO-CULTURAL FACTORS	2.4184	.43080
N = 224		

*Negative statements – recoded in the computation of the mean

improve their health with a mean of 2.38. They also disagreed that they can afford to buy all the food and as well pay for doctor services with a mean rating of 2.07, but agreed that they avoid their friends during their regular physical exercise with a mean rating of 2.53, and disagreed that friends see their regular exercise as shame with a mean rating of 2.46. In overall, the respondents' rating of socio-cultural factors is 2.41, which is below the average.

Table 5.

Individual Factors

	Mean	Std. Deviation
I remember always to take my medication	2.86	.987
I always remember do my physical exercise	2.51	.961
*When I feel better I can stop taking my medication	2.74	.930
It's is easy to follow up the doctor's advise	2.46	.835
My income is enough for me purchase the required diet and medications	2.00	.991
I believe that when I follow healthful life style modifications, my health will significantly improve	2.81	.842
Since live in rural areas, I am able comply to all lifestyle modifications	2.08	.992
I am aware of the importance of following healthful lifestyle modifications	2.79	.753
*Healthful lifestyle modifications are stressing to me despite their importance to my health	3.21	.890
INDIVIDUAL FACTORS	2.3978	.46039
N = 224		

*Negative statements – recoded in the computation of the mean

Table 5 presents the findings of this particular variable. Patients agreed that they remember always to take medication, mean rating was 2.86, always remember do my physical exercise, mean rating of 2.52, they also rated average that when they feel better they can stop taking my medication, mean rating of 2.74, but rated low that it's

is easy to follow up the doctor’s advice, the mean rating on this item is 2.46. The present study further confirmed that hypertensive patients disagreed that income is enough for them to purchase the required diet and medications with a mean rating of 2.00. And they also agreed that they believe that when they follow healthful life style modifications, their health will significantly improve and the mean of the item is 2.81. With a mean rating of 2.08, respondents disagreed that since they live in rural areas, they are able comply to all lifestyle modifications, they agreed that they are aware of the importance of listed healthful lifestyle modifications (mean rating, 2.79), they also agreed that healthful lifestyle modifications are stressing to them despite their importance to their health, mean of 3.21. In general rating, the patients rated below average individual factors with a mean rating 2.40.

Table 6

Family Factors

	Mean	Std. Deviation
My family members support me to take medications or modify my lifestyle	2.58	1.043
I am always served a different diet by my family due to my condition	2.32	1.195
*My family members find my condition as a financial stress to them	2.60	1.001
My family members have enough finances to pay for my hospital bills	1.86	.907
My family members have employed a maid particular to help me comply with lifestyle medications because of my condition	1.64	.969
*My family is too large to deal and following this, they don’t have enough resources and time to manage my condition	2.17	1.000
*My family members drink and smoke hence they cannot help me comply with dietary healthful lifestyle modifications.	2.11	.994
FAMILY FACTORS	2.3603	.57174
N = 224		

*Negative statements – recoded in the computation of the mean

Hypertensive patients who attended special clinic at Nyamira County Hospital agreed that (table 6) family members support them to take medications or modify their lifestyle with a an overall mean rating of 2.58, but disagreed that they are always served a different diet by their family due to being hypertensive, agreed that their family members find their condition as a financial stress to them with a mean rating of 2.60. On the other hand, they disagreed that their family members have enough finances to pay for my hospital bills (mean, 1.86), with a mean rating of 1.86, they also disagreed that their family members have employed a maid particular to help them comply with lifestyle medications because of their condition. Respondents disagreed that their family is too large to deal and following this, they don't have enough resources and time to manage their condition (mean, 2.17) and as well as (mean, 2.17) that their family members drink and smoke hence they cannot help them comply with dietary healthful lifestyle modifications. In an overall mean score of 2.36, the hypertensive patients who attended a special clinic at Nyamira County Hospital rated below average family factors.

Among the factors perceived by the researcher to influence lifestyle modification compliance among hypertensive patients attending special clinic at Nyamira County referral hospital is health services factors. Table 11 presents the findings of the analysis after data collection, the study findings revealed that respondents disagreed that it's easy to get antihypertensive medication with a mean rating of 2.44, hence it's easy according to the patients to get medications. They agreed with a mean rating of 2.75 that hospital where they visit is accessible to them, and as well that doctors treat them with respect, mean rating of 3.24. They also agreed that doctors emphasizes on lifestyle modifications over medication (mean,3.04), they further agreed that they travel long distance to seek medical

services over my condition (mean, 2.90), agreed that the doctor advises to prefer physical exercise and diet management over the use of medicine , the mean rating on this item is 2.85. Hypertensive patients agreed that they are offered health education before treatment of hypertension (mean, 3.04), respondents agreed that the doctor is always present during their regular visit (mean, 2.93). To add on this, the respondents agreed

Table 7

Health Service Factors

	Mean	Std. Deviation
It's easy to get antihypertensive medication	2.44	1.057
The hospital where I visit is accessible to me	2.75	.956
My doctors treat me with respect	3.25	.727
My doctors emphasizes on lifestyle modifications over medication	3.04	.849
*I travel long distance to seek medical services over my condition	2.92	1.027
My doctor advises me to prefer physical exercise and diet management over the use of medicine	2.85	.875
We are offered health education before treatment of hypertension	3.04	.890
The doctor is always present during my regular visit	2.93	.828
There is a good relationship between me and my healthcare services providers	3.12	.792
I have been referred to the dietician within the hospital I visit	2.65	1.131
HEALTH SERVICE FACTORS	2.8147	.51811
N = 224		

*Negative statements – recoded in the computation of the mean

that there is a good relationship between them and their healthcare services providers with a mean item rating of 3.12. They finally agreed that they have been referred to the dietician within the hospital I visit, the mean rating is 2.65. In an overall rating of all the items on health service factors, the mean is 2.81 suggesting that the patients rated average the health service factors.

Relationship between Compliance to Lifestyle Modification and the Independent Variables

Table 12 shows the correlation analysis to ascertain whether there is any significant relationship between dependent variable and the independent variables.

Table 8

Correlation Coefficients

		SOCIO- CULTURAL FACTORS	INDIVIDUAL FACTORS	FAMILY FACTORS	HEALTH SERVICE FACTORS
LEVEL OF COMPLIANCE	Pearson Correlation	.229**	.657**	.509**	.581**
	Sig. (2-tailed)	.001	.000	.000	.000
	N	224	224	224	224

** . Correlation is significant at the 0.01 level (2-tailed).

The findings shows that there is a significant relationship between level of compliance and social cultural factors ($r=0.229$, and $p=0.01$), as well there is a statistically significant relationship between level of compliance and individual factors with $r=0.67$, p value $=0.00$. Family factors and level of compliance are significantly related ($r=0.59$, $p=0.00$). Similarly, there is a significant relationship between health service factors and level of compliance ($r=0.581$ $p=0.00$). The study then concludes that all the factors are significantly related to compliance such that as the level of compliance goes up likewise the factors. The most related factor is individual factors. This suggests that the particular factors had a big role in influencing the level of compliance.

The findings from this study on factors influencing non-compliance correspond to similar studies done: for instance; a study done at Aga Khan University Pakistan on factors affecting compliance to antihypertensive therapy indicates that

non-compliance was affected by forgetfulness, due to side effects, deliberately missing doses, increased number of tablets, inadequately counseled, and due to cost issues (Almas, et al., 2006). Besides, factors can be grouped into several categories, namely; patient-centered factors e.g. age, gender, education, ethnicity, and marital status, therapy-related factors, healthcare system factors, social and economic factors, and disease factors (Jing et al, 2008).

In addition, a study in Kuwait reported that many specific additional factors interfere with diet adherence among Kuwaiti patients. For instance, frequent gatherings with extended families and friends are a regular affair. During these times, patients are consuming more fat, meat, sugar, rice, and wheat flour than before. In addition, Kuwait's climate is like that of a dry desert intensely hot summers and short-cool Winters this may discourage patients from indulging in regular exercise (Serour, 2007).

Non-compliance can be due to factors that are patient-centered, therapy-related, or healthcare system – related. The patient-centered factors can be demographic (age, gender, educational level, and marital status) and psychological (patients' beliefs and motivation towards the therapy, negative attitude, patient-prescriber relationship, understanding of health issues, and patient's knowledge). The therapy-related factors include route of medication, duration of treatment, complexity of treatment, and the side effects of the medicines. The factors associated with the healthcare system include availability, accessibility, and the physician (Khan et al., 2012; Jansiraninatarajan, 2013).

Moreover, it has been reported that non-adherence can be unintentional (such as forgetting) or can be intentional, whereby patients make a decision not to take treatment based on their personal beliefs about their illness and treatment (Hashmi et

al., 2007). Correspondingly, reports show that the major factors contributing to barriers to adherence to diet were unwillingness (48.6%), difficulty adhering to a diet different from that of the rest of the family (30.2%), and social gatherings (13.7%). The main barriers to adherence to exercise were lack of time (39.0%), coexisting diseases (35.6%), and adverse weather conditions (27.8%). And factors interfering with adherence to lifestyle measures among the total sample were traditional Kuwaiti food, which was high in fat and calories (79.9%), stress (70.7%), a high consumption of fast food (54.5%), high frequency of social gatherings (59.6%), abundance of maids (54.1%), and excessive use of cars (83.8%) (Maleka et al., 2007).

Correspondingly, a study by Osamo in Nigeria shows the reasons for non-adherence to dietary recommendations on the basis of criticism by others, lack of information, unwillingness, and lack of support from spouse and/ or family, negative health beliefs and perceptions, previous experience with chronic disease and financial problems (Osamo, 2011).

Moreover, many factors affect the patients' compliance, these may be either related to demographic feature of the patients such as age, sex, level of education, occupation, family size, monthly income, residence, family history and duration of illness (Awad, et al, 2015). Another study has reported that factors that affected patients' compliance were their sex, level of education, work status, smoking habits, self-reported response to medications and their perception of hypertension (Divya & Nadig, 2015).

**Factors that Best Influence Compliance to Lifestyle Modification
among Hypertensive Patients Attending Special Clinic in Nyamira
County Referral Hospital**

The factors that best influence compliance (table 13) to lifestyle modification are individual factors, health service factors, and family factors which account for 51% of the variance in compliance.

Table 9

Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.657 ^a	.432	.430	.41956
2	.712 ^b	.507	.503	.39161
3	.718 ^c	.516	.510	.38901

a. Predictors: (Constant), INDIVIDUAL FACTORS

b. Predictors: (Constant), INDIVIDUAL FACTORS, HEALTH SERVICE FACTORS

c. Predictors: (Constant), INDIVIDUAL FACTORS, HEALTH SERVICE FACTORS, FAMILY FACTORS

The percentage of contribution to compliance to lifestyle modification by each of the factors are: individual factors – 43%, health service factors – 7.3%, family factors - .7%. Individual factors could be contributing more than the other factors because variables like age, forgetfulness, and even attitude may have a high impact on one’s compliance to any lifestyle modification, even compliance to medication as quoted in this study is highly associated with individual factors than other factors.

Table 10

Regressions Coefficients

Model		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized		
		B	Std. Error	Coefficients Beta		
1	(Constant)	.524	.149		3.517	.001
	INDIVIDUAL FACTORS	.793	.061	.657	12.997	.000
2	(Constant)	.044	.162		.270	.787
	INDIVIDUAL FACTORS	.586	.067	.485	8.718	.000
	HEALTH SERVICE FACTORS	.347	.060	.324	5.816	.000
	(Constant)	.021	.161		.129	.898
3	INDIVIDUAL FACTORS	.541	.070	.449	7.687	.000
	HEALTH SERVICE FACTORS	.296	.065	.276	4.585	.000
	FAMILY FACTORS	.116	.058	.119	1.991	.048

a. Dependent Variable: LEVEL OF COMPLIANCE

From the table the regression equation can be developed shown below.

$$Y' = 0.541X_1 + 0.296X_2 + 0.116X_3 + 0.021$$

Other studies have shown that there is a significant rural–urban difference in the non-compliance rate; wherein the non-compliance in the urban population was significantly higher than the rural population. This could be due to fact that urban residents tend to be more sedentary with relatively poor dietary habits as compared to the rural population (Khan et al., 2012).

Several factors have been reported to influence non-compliance among patients from previous studies. Firstly, is the period of chronic disease may affect patients' compliance with treatment regimen. The longer the duration of the disease, the more apparent a patient becomes noncompliant to lifestyle modification and treatment regimen (Awad et al., 2015). Secondly, is physical activity which differs

with family history and is reported to be statistically significant to the marital status. Correspondingly, the relationship between marital status and treatment compliance was observed, where in married participants were more compliant with treatment (61.0%) than non-married participants (Joho, 2012). Thirdly, adherence to dietary advice is higher in those respondents who are nearer to hospital than those who are far and the difference was statistically significant (Parajuli et al., 2014).

In relation to gender, non-adherence to dietary advice of female is higher than male respectively which is statistically significant (Parajuli et al., 2014). Similarly, studies have shown that females were more compliant (63.2%) compared with male (45.8%), which was statistically significant ($P=0.044$). Female patients have been found by some researchers to be better compliant to treatment (Jing et al., 2005; Fodor et al., 2005; Kearney et al., 2005).

Correspondingly, studies have explained the influence of demographic profile on compliance and discovered that with increasing age, dietary advice adherence decreased (Tan et al., 2008; Tan et al., 2001). Hence, with increasing age, the degree of compliance decreases (Parajuli et al., 2014; Krousel-Wood et al., 2009; WHO, 2003).

Education had a significantly effect on patients' compliance, where studies have shown that compliance rate was higher among patients with a low level of education. (Awad et al., 2015; Carvalho et al., 2013). Moreover, other studies have found that patients without formal education level (55.6%) had high treatment compliance compared to those with high education level (37.5%) (Jimmy & Jose, 2011). On the contrary to several studies it has been found that patients with higher educational level might have higher compliance (Okuno et al., 2001; Ghods & Nasrollahzadeh, 2003; Yaruz et al., 2004) while other studies found no association

(Stilley et al., 2004; Wai et al., 2005).

This study summarily, indicates and confirms what previous studies have shown that the determinants of non-adherence to dietary advice included: female gender, increasing age, joint or extended family members, farther distance from hospital, poor knowledge and advice by others than physicians. Besides, determinants for non-adherence to physical activity revealed were negative family history of diabetic modification, divorced status and lower socio-economic class (Janaki, 2014).

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

The study was conducted in Nyamira County which is one of the 47 Counties of Kenya. Nyamira County referral Hospital is the biggest health facility in the County. There has been reported cases of hypertension in the county. Lifestyle modification is generally agreed as the best method through which the condition can be managed. However there is a report from studies that many patients across the world rarely comply with the lifestyle modifications. This study sought to find out the factors that influence lifestyle modifications among patients attending Nyamira county referral Hospital. The study employed descriptive correlational research design in which 224 hypertensive patients were sampled using purposive sampling to participate in the study. Closed ended questionnaire was used to collect data from hypertensive patients attending clinic in Nyamira hospital

Summary of Findings

1. The respondents rated low that they comply with lifestyle modification and that they the individual factors influence lifestyle modification compliance.
2. Hypertensive patients rated socio-cultural factors as average, individual factors as below average, family factors as below average, and health service factors as average.
3. There is a significant direct relationship between level of compliance and sociocultural factors, individual factors, family factors and health service factors.

4. The individual factors, health service factors, and family factors are the best predictors of lifestyle modification compliance.

Conclusions

1. There is low level of compliance to lifestyle modification.
2. The hypertensive patients tend to have negative socio-cultural beliefs on issues on hypertension, have a below average personal understanding of these issues, do not have adequate family support, and tend to be positive on the health services' support.
3. The relationship is direct and moderate for individual, family, and health service factors but weak with socio-cultural factors.
4. The factors that best influence compliance to lifestyle modification are individual factors, health service factors, and family factors which account for 51% of the variance in compliance, with the individual factors having the highest percentage of contribution (43%).

Recommendations

1. The Ministry of Health through the health workers at the special clinics to offer more intensive individualized counseling and support to the hypertensive patients on specific factors affecting their compliance thus enable them improve on their level of compliance to lifestyle modification.
2. The health workers at the special clinics to offer trainings to caregivers of hypertensive patients and their families on how to support their hypertensive patients with lifestyle modification.
3. The management of Nyamira County Hospital special clinics to mitigate and improve on the health service factors affecting compliance to lifestyle modification of the hypertensive patients attending their special clinics

Recommendation for Further Studies

There is need for further studies on each of the lifestyle modification practices to be done among the hypertensive patients and other patients suffering from lifestyle diseases in Nyamira County Hospital and other hospitals in the region and in Kenya.

REFERENCES

- Almas, A., Hameed, A., Ahmed, B., & Islam, M. (2006). Compliance to antihypertensive therapy. *JCPSP, 16*, 23-26.
- Ambaw, A. D., Alemie, G. A., & Mengesha, Z. B. (2012). Adherence to antihypertensive treatment and associated factors among patients on follow up at University of Gondar Hospital, Northwest Ethiopia. *BMC Public Health, 12*(1), 282.
- Anthony, H., Valinsky, L., Gabriel, C., & Varda, S. (2012). Perceptions of hypertension treatment among patients with and without diabetes. *BMC Family Practice, 13*(1), 24.
- Anwer, Z., Sharma, R. K., Garg, V. K., Kumar, N., & Kumari, A. (2011). Hypertension management in diabetic patients. *Eur Rev Med Pharmacol Sci, 15*(11), 1256-126
- Awad, E. Y., Gwaied, B. E., Fouda, L. M., & Essa, H. (2015). Compliance of Hypertensive Patients with Treatment Regimen and Its Effect on Their Quality Of Life. *Health, (13)*, 16.
- Benner, J., Glynn, R., Mogun, H., Neumann, P., Weinstein, M., & Avorn, J. (2002). Long-term persistence in use of statin therapy in elderly patients. *Jama , 288*(4), 455- 61.
- Biradar, S. S., Kapatae, R., Reddy, S., & Raju, S. A. (2012). *Importance of role of pharmacist mediated adherence in hypertensive patients: A brief overview.*
- Blanca, R., Blanca, R., & Ernesto, F. (2001). Pharmacological therapy compliance in diabetes. 233-236.
- Boima, V., Ademola, A. D., Odusola, A. O., Agyekum, F., Nwafor, C. E., Cole, H., ... & Tayo, B. O. (2015). Factors associated with medication nonadherence

- among hypertensives in Ghana and Nigeria. *International Journal of Hypertension*.
- Bovet, P., Ross, A. G., Gervasoni, J. P., Mkamba, M., Mtasiwa, D. M., Lengeler, C., ... & Paccaud, F. (2002). Distribution of blood pressure, body mass index and smoking habits in the urban population of Dar es Salaam, Tanzania, and associations with socioeconomic status. *International Journal of Epidemiology*, *31*(1), 240-247.
- Brundisini, F., Vanstone, M., Hulan, D., DeJean, D., & Giacomini, M. (2015). Type 2 diabetes patients' and providers' differing perspectives on medication nonadherence: a qualitative meta-synthesis. *BMC Health Services Research*, *15*(1), 516.
- Campbell, N. R., Petrella, R., & Kaczorowski, J. (2006). Public education on hypertension: a new initiative to improve the prevention, treatment and control of hypertension in Canada. *Canadian Journal of Cardiology*, *22*(7), 599-603.
- CDC. (2014). *Hypertension :Global view*. New York, USA: CDC.
- CDC. (2015). Prevalence of hypertension in USA. *Center of Disease Control*, 355-380.
- Chatterjee, J. S. (2006). From compliance to concordance. *Journal of Medical Ethics*, *32*(9), 507-510.
- Divya, S., & Nadig, P. (2015). Factors contributing to non-adherence to medication among type 2 diabetes mellitus in patients attending tertiary care hospital in South India. *Asian Journal of Pharmaceutical and Clinical Research*, *8*(2), 274-6.
- Edo, T. A. (2009). Factors affecting compliance with anti-hypertensive drug treatment and required lifestyle modifications among hypertensive patients on Praslin

Island (Doctoral dissertation). <http://uir.unisa.ac.za/handle/10500/3249>
accessed on May 23rd 2016 at 9pm

- Fodor, G. J., Kotrec, M., Bacskai, K., Dorner, T., Lietava, J., Sonkodi, S., et al. (2005): Is interview a reliable method to verify the compliance with antihypertensive therapy? An international central-European study, *Journal of Hypertension*, 23(6), 1261-1266.
- Ghods, A. J., & Nasrollahzadeh, D. (2003). Noncompliance with immunosuppressive medications after renal transplantation. *Experimental and clinical transplantation: Official journal of the Middle East Society for Organ Transplantation*, 1(1), 39-47.
- Gwadry-Sridhar, F. H., Manias, E., Lal, L., Salas, M., Hughes, D. A., Ratzki-Leewing, A., & Grubisic, M. (2013). Impact of interventions on medication adherence and blood pressure control in patients with essential hypertension: a systematic review by the ISPOR medication adherence and persistence special interest group. *Value in Health*, 16(5), 863- 871.
- GoK. (2013). *Annual High Blood Pressure Report*. Nairobi: Ministry of Public Health.
- Gupta, R., & Gupta, S. (2010). Strategies for initial management of hypertension. *The Indian Journal of Medical Research*, 132(5), 531.
- Harris, M. I.S, Cowie, C. C., & Howie, L. J. (1993). Self-monitoring of blood glucose by adults with in the United States population. *Care*, 16(8), 1116-1123.
- Hashmi, S. K., Afridi, M., Abbas, K., Sajwani, R. A., Saleheen, D., philippe, M., et al. (2007): Factors Associated with Adherence to AntiHypertensive Treatment in Pakistan, *PLoS ONE*, 2(3), 280.
- Haynes, R., McDonald, H., & Garg, A. (2002). Helping patients follow prescribed treatment, Clinical applications. *JAMA*, 288, 2880-3.

- IDF. (2010). Prevalence of in the World. *Journal of Health Sciences*, 23(7), 300-415.
- Janaki P., F. S. (2014). Factors associated with nonadherence to diet and physical activity among nepalese type 2 patients; a cross sectional study. *Biomedical Central*, 3-9.
- Jansiraninatarajan. (2013). Diabetic compliance: A qualitative study from the patient's perspective in developing countries. *Journal of Nursing and Health Science*, 1(4), 29-38.
- Jimmy, B., & Rose, J. (2011). Patient medication adherence: measures in daily practice. *Oman Med J*, 26(3), 155-159.
- Jin, J., Sklar, G. E., Oh, V. M. S., & Li, S. C. (2008). Factors affecting therapeutic compliance: A review from the patient's perspective. *Therapeutics and Clinical Risk Management*, 4(1), 269.
- Jing, J., Grant, E. S., Vernon, M. S., & Shu, C. (2009): Factors affecting therapeutic compliance: A review from the patient's perspective. 4 (1), 269-286.
- Joho, A. A. (2012). *Factors Affecting Treatment Compliance Among Hypertension Patients in three District Hospitals-Dar es Salaam* (Doctoral dissertation, Muhimbili University of Health and Allied Sciences).
- KDMI. (2015). *The Kenya management and information center*. Nairobi: KDMI.
- Jones, T. L. (2013). Diabetes Mellitus: the increasing burden of disease in Kenya. *South Sudan Medical Journal*, 6(3), 60-64.
- Joshi, M. D., Ayah, R., Njau, E. K., Wanjiru, R., Kayima, J. K., Njeru, E. K., & Mutai, K. K. (2014). Prevalence of hypertension and associated cardiovascular risk factors in an urban slum in Nairobi, Kenya: a population-based survey. *BMC Public Health*, 14(1), 1177.

- Kaiser, B., Razurel, C., & Jeannot, E. (2013). Impact of health beliefs, social support and self-efficacy on physical activity and dietary habits during the post-partum period after gestational diabetes mellitus: study protocol. *BMC Pregnancy and Childbirth*, 13(1), 133.
- Kardiyol, A. (2009). The assessment of adherence of hypertensive individuals to treatment and lifestyle change recommendations. *Pubmed*, 9(2), 102-9.
- Kearney, J. (2012). Global view of hypertension. *Journal of Hypertension*, 203-320.
- Khan, A. R., Lateef, Z. N. A. A., Al Aithan, M. A., Bu-Khamseen, M. A., Al Ibrahim, I., & Khan, S. A. (2012). Factors contributing to non-compliance among diabetics attending primary health centers in the Al Hasa district of Saudi Arabia. *Journal of Family and Community Medicine*, 19(1), 26.
- Kearney, P. M., Whelton, M., Reynolds, K., Muntner, P., Whelton, P. K., & He, J. (2005). Global burden of hypertension: analysis of worldwide data. *The Lancet*, 365(9455), 217-223.
- Law, M., Wald, N., & Morris, J. (2003). Lowering blood pressure to prevent myocardial infarction and stroke: a new preventive strategy. *Health Technol Assess*, 7, 1-94.
- Loghman-Adham, M. (2003). Medication noncompliance in patients with chronic disease: issues in dialysis and renal transplantation. *American Journal of Managed Care*, 9(2), 155-173.
- Mahrous, F. M. (2015). Factors Affecting Compliance of Hypertensive Patients toward Therapeutic Regimen. *Life Science Journal*, 12(10).
- Mahmoud, M. I. (2012). Compliance with treatment of patients with hypertension in Almadinah Almunawwarah: A community-based study. *Journal of Taibah University Medical Sciences*, 7(2), 92–98.

- Maina W.K, Ndegwa Z.M, Njenga E.W, and Muchemi E.W (2011). Knowledge, attitude, and practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. *Africa Journal of Diabetes Medicine*, 19(1), May 2011.
- Maleka Serour, H. A.-S.-R. (2007). Cultural factors and patients' adherence to lifestyle measures. *British Journal of General Practice*, 57, 291–295.
- Mayo Clinic, (2015). Diabetes management: How lifestyle, daily routine affect blood sugar. *Mayo Foundation for Medical Education and Research*, 106-228.
- Meinema, J. G., van Dijk, N., Beune, E. J., Jaarsma, D. A., van Weert, H. C., & Haafkens, J. A. (2015). Determinants of adherence to treatment in hypertensive patients of African descent and the role of culturally appropriate education. *PloS One*, 10(8), e0133560.
- Mohan, V., Deepa, M., Farooq, S., Datta, M., & Deepa, R. (2007). Prevalence, awareness and control of hypertension in Chennai-the Chennai urban rural epidemiology study (CURES–52). *Journal of Association of Physicians of India*, 55, 326-32.
- Mugenda, M. O. (2013). *Research Methods Qualitative. Approach*. Nairobi: Nairobi University Press.
- Mumu, S. J., Saleh, F., Ara, F., Afnan, F., & Ali, L. (2014). Non-adherence to lifestyle modification and its factors among type 2 diabetic patients. *Indian Journal of Public Health*, 58(1), 40.
- McFarlane, W. R. (2004). *Multifamily groups in the treatment of severe psychiatric disorders*. Guilford Press.
- Naeem, M., Rahimnajjad, N. A., Rahimnajjad, M. K., Khurshid, M., Ahmed, Q. J., Shahid, S. M., ... & Najjar, M. M. (2012). Assessment of characteristics of

- patients with cholelithiasis from economically deprived rural Karachi, Pakistan. *BMC Research Notes*, 5(1), 1.
- NCHSU, (2014). National Center for Health Statistics (US. "Health Risk Factors."
- Nazir,A., Muhammad ,A., Syed, H. S.,& Waqas, A. (2008). Compliance to antihypertensive drugs, Salt restriction, Exercise and Control of systemic hypertension in hypertensive patients at Abbottabad. *Ayub Med*, 20(2) 66-68.
- Neutel, C. I., & Campbell, N. R. (2008). Changes in lifestyle after hypertension diagnosis in Canada. *Canadian Journal of Cardiology*, 24(3), 199-204.
- Nwankwo, C. H., Nandy, B., & Nwankwo, B. O. (2010). Factors influencing management outcome among patients attending government health facilities in South East, Nigeria. *Int J Trop Med*, 5(2), 28-36.
- Nyabonyi, D. 2015, Lifestyle diseases emerge as a new threats to Nyamira people, *Nyamira County News* HYPERLINK "<http://www.hivisasa.com/nyamira>" <http://www.hivisasa.com/nyamira> accessed on 25th May, 2016 at 2.40pm.
- Odedosu, T., Schoenthaler, A. N. T. O. I. N. E. T. T. E., Vieira, D. L., Agyemang, C., & Ogedegbe, G. (2012). Overcoming barriers to hypertension control in African Americans. *Cleveland Clinic Journal of Medicine*, 79(1), 46-56.
- Okonta, H. I., Ikombele, J. B., & Ogunbanjo, G. A. (2014). Knowledge, attitude and practice regarding lifestyle modification in type 2 diabetic patients. *African Journal of Primary Health Care & Family Medicine*, 6(1), 1-6.
- Okuno, J., Yanagi, H., & Tomura, S. (2001). Is cognitive impairment a risk factor for poor compliance among Japanese elderly in the community? *Eur J Clin Pharmacol*, 57, 589–94.

- Omari, B. G. (2013). *Assessment of the level of knowledge, self care practice and glycemic control among patients with type 2* (Doctoral dissertation, University of Nairobi).
- Onen, C. L. (2013). Epidemiology of ischaemic heart disease in sub-Saharan Africa: review article. *Cardiovascular Journal of Africa*, 24(2), 34-42.
- Osamo, P. E. (2011). Nigeria, Factors Associated with Treatment Compliance in Hypertension in Southwest. *J Health Popul Nutr.*, 29(6):, 619–628.
- Parajuli, J., Saleh, F., Thapa, N., & Ali, L. (2014). Factors associated with nonadherence to diet and physical activity among Nepalese type 2 diabetes patients; a cross sectional study. *BMC Research Notes*, 7(1), 758.
- Rubin, R. R. (2005). Adherence to pharmacologic therapy in patients with type 2 diabetes mellitus. *The American Journal of Medicine*, 118(5), 27-34.
- Santhanakrishnan, I., Lakshminarayanan, S., & Kar, S. S. (2014). Factors affecting compliance to management of in Urban Health Center of a tertiary care teaching hospital of south India. *Journal of Natural Science, Biology, and Medicine*, 5(2), 365–368. <http://doi.org/10.4103/0976-9668.136186>
- Sabate, E. (2003). *Adherence to long term therapies: Evidence for action*. Switzerland: WHO.
- Serour, M., Alqhenai, H., Al-Saqabi, S., Mustafa, A. R. and Nakhi, A. B. (2007). Cultural factors and patients adherence to lifestyle measures. *The British Journal of General Practice*, 57(537), 291 – 295
- Stilley, C. S., Sereika, S., Muldoon, M. F., Ryan, C. M., & Dunbar-Jacob, J. (2004). Psychological and cognitive function: predictors of adherence with cholesterol lowering treatment. *Annals of Behavioral Medicine*, 27(2), 117-124.

- Svetkey, L. P., Erlinger, T. P., Vollmer, V. M., Feldstein, A., Cooper, L. S., Appel, L. J., et al. (2005). Effects of comprehensive lifestyle modifications on blood pressure by race, sex, hypertension status and age: the report of the Premier Collaborative Research Group. *Journal of Human Hypertension*, 19, 21-31.
- Van de Vijver, S., Akinyi, H., Oti, S., Olajide, A., Agyemang, C., Aboderin, I., & Kyobutungi, C. (2013). Status report on hypertension in Africa-consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCD's. *Pan African Medical Journal*, 16(1).
- Wai, C. T., Wong, M. L., Ng, S., Cheok, A., Tan, M. H., Chua, W., ... & Lim, S. G. (2005). Utility of the Health Belief Model in predicting compliance of screening in patients with chronic hepatitis B. *Alimentary Pharmacology & Therapeutics*, 21(10), 1255-1262.
- Wang, P. S., Bohn, R. L., Knight, E., Glynn, R. J., Mogun, H., & Avorn, J. (2002). Noncompliance with antihypertensive medications. *Journal of General Internal Medicine*, 17(7), 504-511
- WHO. (2003): Adherence to long-term therapies: evidence for action Geneva.
- WHO. (2006): International Society of Hypertension. Guidelines for the management of hypertension-part II. *Cardiology Today*, 6, 146- 1647.
- WHO, (2009), World Health Organization, Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks.
- WHO. (2011). World Health Rankings, live longer live better, Tanzania: Stroke.
- WHO. (2014). Global prevalence. *World Health Organization*, 50-62.
- WHO, (2014) Kenya: Hypertension.... World Health Rankings –live longer live better. <http://www.worldlife.expectancy.com/kenya-hypertension> accessed on 11th July, 2016.

- WHO. (2015). Global Prevalence of Estimates for the year 2000 and projections for 2030. *27(5)*, 1047-1053
- Wolz, M., Cutler, J., Roccella, E., Rohde, F., Thom, T., & Burt, V. (2000): Statement from the National High Blood Pressure Education Program: prevalence of hypertension. *Am J Hypertens*, *13*, 103-104.
- Zieger, A. (2005) *Does Better Packaging Equal Better Patient Compliance?*
[Available from: <http://www.pharmamanufacturing.com/articles/2005/312.html>]
- Zungu, L., Djumbe, F. R., & Setswe, G. (2013). Knowledge and lifestyle practices of hypertensive patients attending a primary health care clinic in Botswana. *African Journal for Physical, Health Education, Recreation and Dance*, *November*(Supplement 1), 133 - 148.

APPENDIX 1: RESEARH QUESTIONNNAIRE

Please do not indicate your name to ensure confidentiality. Tick the box provided according to what applies to you.

Questionnaire

Instructions: circle the best answer that you agree with based on the statement or question asked before the statement.

Demographic profile of the respondents

Age

Select your age group

[a] 18-28 [b]29-39 [c]40-50 [d] 51-62 [e] 63 and above

Gender

[a] Male [b] female

Marital Status

[a] Married [b] single [c] divorced [d]separated

Level of education

[a] primary [b] secondary [c] college/university [d] other specify_____

Occupation

[a] Employed [a] Self-employment [c]not employed

Your residence

[a] Urban [b] Rural [c] Both rural and urban

Instruction: Circle the number against the statement to show your level of agreement to the stated sentence

1- Mean strongly agree

2- Means agree

3- Means disagree

4- Means strongly disagree.

- To find out the level of compliance to lifestyle modification among hypertensive patients attending the special clinics in Nyamira County Referral Hospital.

- | | | | | |
|---|---|---|---|---|
| 1. I do regular exercises as advised by the doctor | 1 | 2 | 3 | 4 |
| 2. I take the prescribed diet as per my doctors advise | 1 | 2 | 3 | 4 |
| 3. I avoid taking harmful substances such as alcohol and tobacco as advised by my physician | 1 | 2 | 3 | 4 |
| 4. I know how to manage my stress | 1 | 2 | 3 | 4 |
| 5. I always keep doctor's appointments | 1 | 2 | 3 | 4 |
| 6. I always follow the advice of my spouse on diet, exercise etc | 1 | 2 | 3 | 4 |
| 7. I buy all the required diet and medication as per the doctor's advice | 1 | 2 | 3 | 4 |
| 8. I always keep my doctors dietary advice even | 1 | 2 | 3 | 4 |

if I am in a party or wedding.

- To determine the socio- cultural factors influencing compliance to lifestyle modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

1. I don't like doing exercise in public	1	2	3	4
2. My friends laugh at me when performing physical exercises	1	2	3	4
3. There is no enough space to performed physical exercise in my house or my compound	1	2	3	4
4. I avoid public matters that influence my health e.g politics	1	2	3	4
5. I avoid any social gathering that influence my health status negatively	1	2	3	4
6. Though have been advised to avoid certain food, there us/are type of food or drinks I cannot leave when in a party or ceremonies	1	2	3	4
7. I use the kind of transport that helps me to improve my health e.g walking, circling.	1	2	3	4
8. I am criticized by my friends when I follow doctors' advice to improve my health	1	2	3	4

- | | | | | |
|---|---|---|---|---|
| 9. I can afford to buy all the food and as well pay
for my doctor services | 1 | 2 | 3 | 4 |
| 10. I avoid my friends during my regular physical
exercise | 1 | 2 | 3 | 4 |
| 11. My friends see my regular exercise as shame | 1 | 2 | 3 | 4 |

- To determine the individual factors influencing compliance to lifestyle modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

- | | | | | |
|--|---|---|---|---|
| 1. I remember always to take my medication | 1 | 2 | 3 | 4 |
| 2. I always remember do my physical exercise | 1 | 2 | 3 | 4 |
| 3. When I feel better I can stop taking my
medication | 1 | 2 | 3 | 4 |
| 4. It's is easy to follow up the doctor's advise | 1 | 2 | 3 | 4 |
| 5. My income is enough for me purchase the
required diet and medications | 1 | 2 | 3 | 4 |
| 6. I believe that when I follow healthful life style
modifications, my health will significantly
improve | 1 | 2 | 3 | 4 |
| 7. Since live in rural areas, I am able comply to
all lifestyle modifications | 1 | 2 | 3 | 4 |
| 8. I am aware of the importance of following | 1 | 2 | 3 | 4 |

healthful lifestyle modifications

9. Healthful lifestyle modifications are stressing 1 2 3 4
to me despite their importance to my health

- To determine the family factors influencing compliance to lifestyle modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

1. My family members support me to take 1 2 3 4
medications or modify my lifestyle

2. I am always served a different diet by my 1 2 3 4
family due to my condition

3. I inherited hypertension diseases from my 1 2 3 4
parents or grandparents

4. My family members find my condition as a 1 2 3 4
financial stress to them

5. My family members have enough finances to 1 2 3 4
pay for my hospital bills

6. My family members have employed a maid 1 2 3 4
particular to help me comply with lifestyle
medications because of my condition

7. My family is too large to deal and following 1 2 3 4
this, they don't have enough resources and

time to manage my condition

8. My family members drink and smoke hence 1 2 3 4
they cannot help me comply with dietary
healthful lifestyle modifications.

- To determine the health service factors influencing compliance to lifestyle modification among hypertensive patients attending special clinic in Nyamira County Referral Hospital.

1. It's easy to get antihypertensive medication 1 2 3 4
2. The hospital where I visit is accessible to me 1 2 3 4
3. My doctors treat me with respect 1 2 3 4
4. My doctors emphasizes on lifestyle 1 2 3 4
modifications over medication
5. I travel long distance to seek medical services 1 2 3 4
over my condition
6. My doctor advises me to prefer physical 1 2 3 4
exercise and diet management over the use of
medicine
7. We are offered health education before 1 2 3 4
treatment of hypertension
8. The doctor is always present during my 1 2 3 4
regular visit

9. There is a good relationship between me and my healthcare services providers 1 2 3 4
10. I have been referred to the dietician within the hospital I visit 1 2 3 4

APPENDIX 2: INFORMATION AND CONSENT FORM

Dear respondent

I am **Stephen MaritaOgega** a Master of Public Health student in the University of Eastern Africa Baraton, Department of Public Health. I am conducting a research with the purpose of; **“Determining the factors influencing compliance and non-compliance to lifestyle modification among hypertensive and diabetic patients attending special clinics in Nyamira Country Referral Hospital”**.

You have been selected as a respondent in this study where you will play an important role. Approximately 10-15 minutes of your time will be required to fill the questionnaire that is provided alongside this consent. Participation in this study is voluntary and withdrawal is also at will. This is therefore to request you to respond suitably to the questions given below, express your views freely without fear or favor, and please note that information given will be treated with utmost confidentiality and in case of any clarification please feel free to ask.

Participant

I have read and understood what this study is and therefore, I voluntarily consent to participate:

Participant’s signature _____
Date _____

Investigator

I have explained this study to the above subject and have sought his/her understanding for informed consent.

Investigator’s signature _____
Date _____

Stephen Marita Ogega
Department of Public Health,
Baraton, University of Eastern Africa Baraton,

Director of Graduate Studies:
University of Eastern Africa
P.O. BOX 250 P.O. BOX
2500 **ELDORET.**

Phone: 077 13 36 03

APPENDIX 4
SPSS OUTPUT

Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.911	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I do regular exercises as advised by the doctor	25.1667	12.282	.800	.894
I take the prescribed diet as per my doctors advise	25.2000	12.234	.789	.895
I avoid taking harmful substances such as alcohol and tobacco as advised by my physician	25.7000	11.045	.706	.904
I know how to manage my stress	25.1000	11.541	.858	.887
I always keep doctor's appointments	25.6333	11.413	.703	.902
I always follow the advice of my spouse on diet, exercise etc	25.2333	11.564	.703	.901
I buy all the required diet and medication as per the doctor's advice	25.1667	12.971	.594	.909
I always keep my doctors dietary advice even if I am in a party or wedding.	25.1000	12.921	.666	.905

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
28.9000	15.472	3.93350	8

Reliability

Case Processing Summary

		N	%
Valid		30	100.0
Cases Excluded ^a		0	.0
Total		30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.783	11

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
*I don't like doing exercise in public	34.0000	19.448	.296	.781
*My friends laugh at me when performing physical exercises	34.4333	16.392	.688	.735
*There is no enough space to perform physical exercise in my house or my compound	35.2667	18.754	.213	.802
I avoid public matters that influence my health e.g politics	34.0333	19.826	.298	.780
I avoid any social gathering that influence my health status negatively	33.9333	20.133	.258	.783
*Though have been advised to avoid certain food(s), there is/are type(s) of food or drink(s) I cannot leave when in a party or ceremonies	33.9333	18.754	.397	.771
I use the kind of transport that helps me to improve my health e.g walking, cycling.	34.4667	17.637	.577	.752
*I am criticized by my friends when I follow doctors' advice to improve my health	34.4667	15.223	.728	.725
I can afford to buy all the food and as well pay for my doctor services	34.0000	18.552	.322	.781
*I avoid my friends during my regular physical exercise	34.0000	17.793	.606	.750
*My friends see my regular exercise as shame	34.1333	18.189	.509	.760

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
37.6667	21.609	4.64857	11

Reliability

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.794	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I remember always to take my medication	27.6333	9.551	.585	.765
I always remember do my physical exercise	27.6333	9.137	.746	.748
*When I feel better I can stop taking my medication	27.8667	9.982	.133	.841
It's is easy to follow up the doctor's advise	28.3000	9.183	.529	.767
My income is enough for me purchase the required diet and medications	27.7000	9.666	.590	.767
I believe that when I follow healthful life style modifications, my health will significantly improve	28.8000	9.683	.248	.813
Since live in rural areas, I am able comply to all lifestyle modifications	27.7333	8.685	.806	.735
I am aware of the importance of following healthful lifestyle modifications	28.3667	8.240	.600	.756
*Healthful lifestyle modifications are stressing to me despite their importance to my health	27.7000	9.252	.628	.758

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
31.4667	11.430	3.38081	9

Reliability

Case Processing Summary

		N	%
Valid		30	100.0
Cases Excluded ^a		0	.0
Total		30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.482	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
My family members support me to take medications or modify my lifestyle	25.2000	4.648	.565	.309
I am always served a different diet by my family due to my condition	25.2667	5.444	.141	.485
*I inherited hypertension diseases from my parents or grandparents	26.0333	6.930	-.223	.620
*My family members find my condition as a financial stress to them	25.2000	4.855	.295	.412
My family members have enough finances to pay for my hospital bills	25.1000	5.334	.650	.361
My family members have employed a maid particular to help me comply with lifestyle medications because of my condition	24.9667	6.516	.072	.488
*My family is too large to deal and following this, they don't have enough resources and time to manage my condition	25.4333	5.013	.172	.481
*My family members drink and smoke hence they cannot help me comply with dietary healthful lifestyle modifications.	25.3333	4.782	.467	.344

*Deleted in the final questionnaire

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
28.9333	6.616	2.57218	8

Reliability

Case Processing Summary

		N	%
Cases	Valid	29	96.7
	Excluded ^a	1	3.3
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.849	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
It's easy to get antihypertensive medication	31.2759	13.278	.596	.836
The hospital where I visit is accessible to me	31.3103	13.865	.346	.850
My doctors treat me with respect	32.1724	11.648	.681	.822
My doctors emphasizes on lifestyle modifications over medication	31.3793	10.887	.885	.800
*I travel long distance to seek medical services over my condition	31.5172	11.901	.379	.866
My doctor advises me to prefer physical exercise and diet management over the use of medicine	31.4483	11.113	.720	.817
We are offered health education before treatment of hypertension	31.3793	12.315	.676	.825
The doctor is always present during my regular visit	32.1379	12.123	.673	.824
There is a good relationship between me and my healthcare services providers	32.1724	12.576	.454	.844
I have been referred to the dietician within the hospital I visit	31.1379	14.623	.309	.854

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
35.1034	15.096	3.88536	10

APPENDIX 5

LETTERS OF AUTHORIZATION

REPUBLIC OF KENYA



MINISTRY OF HEALTH

Telegrams: Medical Nyamira
Telephone 058-61-44215
Fax: 058-6144003
E-mail: hospitalnyamira@yahoo.com
When replying please quote

NYAMIRA COUNTY HOSPITAL
P.O BOX 3
NYAMIRA

Ref: NYM/224/VOL.6/(133)

Date: 8th May, 2017

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: STEPHEN MARITA OGEKA

The above named student from the University of Eastern Africa, Baraton has been granted permission to gather research data on **Factors influencing compliance to lifestyle modifications among hypertensive patients attending special clinic in Nyamira County Referral Hospital.**

Please accord him the necessary assistance that he may require.


Walter Nyabuti
For: Medical Superintendent
NYAMIRA COUNTY HOSPITAL

MEDICAL SUPERINTENDENT
NYAMIRA DISTRICT HOSPITAL
P.O. BOX 3 - NYAMIRA

MINISTRY OF HEALTH



Telegramme "medical" Kisii
Telephone: (058) 31310 Kisii
Email: kisiihospital@gmail.com
Web: www.kisiihospital.org.ke

DEPARTMENT OF RESEARCH
THE KISII TEACHING & REFERRAL HOSPITAL
P.O. BOX 92
KISII

REF. NO.

DATE: 11TH APRIL, 2017

STEPHEN MARITA OGEKA

RE: DATA COLLECTION

This is to inform you that the research department of Kisii Teaching and Referral Hospital has reviewed your proposal titled

"Factors influencing compliance to lifestyle modifications among hypertensive patients attending special clinic at Kisii Teaching & Referral Hospital."

The following are our comments.

- 1) You have been authorized to proceed with data collection upon.
- 2) Ensure confidentiality for your study subjects.
- 3) Ensure data collected is used for academic purposes only.
- 4) Ensure a copy of the final report is submitted to this office for retention and use.



DR. E.B. MASANTA
-MBChB (UoN), MPH (Epidem) (JOUUST),
PGDPM (KIM) Applied Epidem & Bio (UoN).

FOR: CHIEF EXECUTIVE OFFICER
KISII TEACHING AND REFERRAL HOSPITAL



**OFFICE OF THE DIRECTOR OF GRADUATE
STUDIES AND RESEARCH**
UNIVERSITY OF EASTERN AFRICA, BARATON
P. O. Box 2500, Eldoret, Kenya

06 April, 2017

TO WHOM IT MAY CONCERN:


Re: PILOT STUDY OF RESEARCH INSTRUMENT

Mr. Stephen Marita Ogega is a graduate student pursuing the degree **Master of Public Health** at the University of Eastern Africa, Baraton. He is currently writing his thesis entitled *Factors influencing compliance to lifestyle modifications among hypertensive patients attending special clinic in Nyamira County Referral Hospital*.

To establish the reliability of his research instrument, Mr. Ogega is conducting a pilot study. Kindly allow him to administer the questionnaire to the selected respondents in your institution.

Any assistance you will grant him will be greatly appreciated. May God richly bless you in all your undertakings.

Yours Sincerely,


Prof. Elizabeth M. Role, PhD
Director



Cc: Chair, Department of Public Health
Office File



**OFFICE OF THE DIRECTOR OF GRADUATE STUDIES
AND RESEARCH**

UNIVERSITY OF EASTERN AFRICA, BARATON

P. O. Box 2500-30100, Eldoret, Kenya, East Africa

May 2, 2017

Stephen Marita Ogega
University of Eastern Africa, Baraton
Department of Public Health

Dear Stephen,

Re: ETHICS CLEARANCE FOR RESEARCH PROPOSAL (REC: UEAB/1/5/2017)

Your research proposal entitled "**Factors influencing compliance to Lifestyle Modifications among Hypertensive Patients attending Special Clinic in Nyamira County Referral Hospital**" was discussed by the Research Ethics Committee (REC) of the University and your request for ethics clearance was granted approval.

This approval is for one year effective May 2, 2017 until May 2, 2018. For any extension beyond this time period, you will need to apply to this committee one month prior to expiry date. Note that you will need a clearance from the study site before you start gathering your data.

We wish you success in your research.

Sincerely yours,

A handwritten signature in blue ink that reads "Jackie K. Obey".

Dr. Jackie K. Obey
Chairperson, Research Ethics Committee



A SEVENTH-DAY ADVENTIST INSTITUTION OF H IGH ER LEARNING
CHARTERED 1991



**OFFICE OF THE DIRECTOR OF GRADUATE
STUDIES AND RESEARCH**

UNIVERSITY OF EASTERN AFRICA, BARATON
P. O. Box 2500, Eldoret, Kenya

02 May 2017

THE HOSPITAL SUPERINTENDENT
Nyamira County Referral Hospital
P. O. Box 3, Nyamira
Kenya

Re: REQUEST FOR PERMISSION TO GATHER RESEARCH DATA

Mr. Stephen Marita Ogega is a graduate student pursuing the degree **Master of Public Health** at the University of Eastern Africa, Baraton. He is currently writing his thesis entitled *Factors influencing compliance to lifestyle modifications among hypertensive patients attending special clinic in Nyamira County Referral Hospital.*

Kindly allow him to administer his questionnaires to selected hypertensive patients attending special clinic in your hospital. He will gather his research data within the month of May, 2017.

Any assistance you will grant him will be greatly appreciated. May God richly bless you in all your undertakings.

Sincerely yours,


Prof. Elizabeth M. Role, PhD
Director

Cc: Chair, Department of Public Health
Office File



APPENDIX 6: CURRICULUM VITAE

NAME: STEPHEN MARITA OGEGA

ADDRESS: P.O BOX 285, CODE No: 40500

Email address: ogegastephen@yahoo.com

Mobile No: 070358821/0733521502

DATE OF BIRTH: 29TH DECEMBER, 1963.

MARITAL STATUS: MARRIED

2. EDUCATIONAL AND PROFESSIONAL QUALIFICATION

- 2014- TO DATE: MPH STUDENT AT UNIVERSITY OF ESTERN AFRICA BARATON
- 2009-2013: DEGREE AT UNIVERSITY OF ESTERN AFRICA BARATON
- 2011-2012: DCH/POST PAEDIATRIC GRATUATE AT ADVENTIST UNIVERSITY OF AFRICA IN CONJUCTION WITH UNIVERSITY OF SIDNEY AUSTRALIA
- 1980-1982: SENGERA MANGA HIGH SCHOOL
- 1982-1983: NYAMIRA TECHNICAL HIGH SCHOOL
- 1973-1979: NYANDIBA PRIMARY SCHOOL

3. CAREER PROFILE

TRAINING AND SEMINARS ATTENDED

- REPRODUCTIVE HEALTH
- HEALTH MANGEMENT
- VCT (VOLUNTARY COUNSELING AND TESTING)
- MALARIA MANAGEMNT
- HIV TESTINT AND COUNSELING
- CHRONIC DISEASES (HYPERTENSION&)
- HEALTH INFORMATION MANAGEMENT SYSTEM

5. WORK EXPERIENCE

2005-2016: HEALTH MINISTRIES /HIV&AIDS DIRECTOR, SDA CHURCH NYAMIRA
CONFERENCE

1999-2005: INCHARGE OF KEMERA SDA HEALTH CENTRE, P.O BOX 285, CODE
No. 40500, NYAMIRA

1995-1999: INCHARGE OF KENYENYA SDA HEALTH CENTRE, P.O BOX 285, Code
No. 40500, NYAMIRA

1994: INCHARGE OF RIOKINDO SDA HEALTH CENTRE P.O BOX CODE No. KISII

1989-1994: INCHARGE OF CHEBWAI SDA HEALTH CENTRE, P.O BOX, CODE No.
WEBUYE

6. TRAINING AND SEMINAR SECTION IN YOUR CV-ATTENDED SHOULD BE INCLUDED HERE

7. HOBBIES AND INTEREST: I like making friends, watching movies plus socializing,
listening to Christian music

8. REFEREES:

Chairman: SEVENTH DAY ADVENTIST CHURCH, NYAMIRA CONFERENCE

Secretary: SEVENTH DAY ADVENTIST CHURCH, NYAMIRA CONFERENCE

Lecturer: Prof. Role/Ms. UEA BARATON ASENATH BARONGO NYANTIKA