

**HEALTH SEEKING BEHAVIOUR AND LIFESTYLE MODIFICATION
STRATEGIES OF HYPERTENSIVE PATIENTS IN IMENTI NORTH SUB
COUNTY, KENYA**

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**A Thesis Submitted to the Graduate School in Partial Fulfilment of the
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Chuka University**

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DECLARATION AND RECOMMENDATION

Declaration

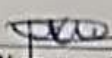
This thesis is my original work and has not been presented for an award of a degree in any other University or Institution.

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Recommendation

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DEDICATION

This thesis is dedicated to my father and mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

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Dr. Lucy Gitonga and Dr. Paul Kamweru have been the ideal thesis supervisors. Their sage advice, insightful criticisms, and patient encouragement aided the writing of this thesis in innumerable ways. I would also like to thank the Nursing Department fraternity whose guidance of this project was deeply appreciated.

ABSTRACT

Globally, the prevalence of Non-Communicable diseases such as hypertension is increasing dramatically hence a burden to low income countries such as Kenya. In Kenya the prevalence of hypertension has increased gradually over the last 20 years. Cases of hypertension remains persistently high in Imenti North Sub County despite compliance to a range of drugs administered. The patient' knowledge of lifestyle modification and how they apply complementary strategies such as lifestyle modification strategies is not documented. The objective of the study was to determine knowledge, practice of lifestyle modification strategies and factors affecting health seeking behaviour of hypertensive patients in relation to management and control of hypertension. The research study was a cross-sectional study design. The study population consisted of hypertensive patients in Imenti North sub County of Meru County. Cluster random sampling method was used to select five (5) health facilities for study. Then purposive sampling was used to select total of 212 patients from the selected health facility proportionally. Data was collected using self-administered questionnaires. The collected data was analysed using statistical package for social science (SPSS) for windows version 23.0. Descriptive analysis was used to obtain frequencies and percentages. The relationship between study variables was tested using Spearman's Rho correlation and bivariate logistic regression to check for the strength of the associations. The research found out that most of the patients seeking health care services in Imenti North Sub County have an average mean of 51 years and higher proportions were above 40 years of age. Majority of the patients were married and female (66.5%), and 60% respectively. An average number of participants (42%) had a secondary level of education with some having tertiary education and others non-formal education. The study findings showed that knowledge on lifestyle modification strategies used in management of hypertension was above average (68%) among the patients in this County, and this was attributed to various factors including health education given during hypertensive clinics. On practice of lifestyle modification strategies, five strategies were assessed; regular physical exercise, low salt diet, limited alcohol intake if any, cessation of smoking, and monitoring body weight gain. Each of the strategy was significantly contributing to good control of blood pressure among the participants; regular physical exercise ($\chi^2=4.259$, $N=200$, $p=0.039$), low salt diet ($\chi^2=4.259$, $N=200$, $p=0.039$), limited alcohol intake if any ($\chi^2=23.159$, $N=200$, $p=0.000$), cessation of smoking ($\chi^2=3.705$, $N=200$, $p=0.049$), and monitoring body weight gain ($\chi^2=3.999$, $N=200$, $p=0.046$). When each of the strategy was analyzed on how it influenced blood pressure control, it was evident that the patients who practiced the recommended strategies had their blood pressure controlled. Slow service delivery, long queues and the long waiting times for the laboratory results for investigations demotivated patients from seeking the health care services. The study recommends the Government of Kenya to develop policies on implementation of support groups among hypertensive patients in all hospitals and intensify campaigns on practice of lifestyle modification strategies in management of hypertension to reduce the burden on drug procurement and promote good health of her citizens. This will empower the patients on knowledge of hypertension management. The study also recommends health care providers to ensure availability of the drugs used in management of hypertension and reduce the waiting time for the patients.

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ACRONYMS AND ABBREVIATIONS

BMI	Body mass index
BP	Blood pressure
CVA	Cerebral Vascular Accident
CVD	Cardio Vascular Disease
DASH	Dietary approach to stop hypertension
Df	Degree of freedom
DBP	Diastolic Blood pressure
HBM	Health belief model
HIV	Human immune-deficiency virus
HP	Health Provider
HIS	Health information system
HTN	Hypertension
MOH	Ministry of Health
NACOSTI	National council of science and technology
NCD	Non-Communicable Disease
OR	Odds ratio
PHC	Primary health care center
PMV	Patient medicine vendor
SPSS	Statistical package for social science
TRA	Theory of reasoned action

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Hypertension (HTN), is commonly defined as a systolic blood pressure (BP) greater than 140/90mmHg and/or diastolic blood pressure higher than 90mmHg. These are the ranges in blood pressure that a person who has them is considered to be having normal blood pressure; diastolic pressure of 60-90mmHg and systolic pressure of 120-140mmHg (Ram & Venkata, 2014). Hypertension is considered a great contributor to non-communicable disease (NCD) load in both developing and also developed countries, especially in developing countries where diagnosis is done at late stages (Mark *et al.*, 2014). Hypertension commonly known as high/elevated or raised blood pressure. Elevated blood pressure causes the blood vessels to have persistently raised pressure, thus the harder the heart works to pump blood resulting to the development of complications within the heart and to other organs like the brain. Hypertension is also known as a “silent killer” and it is mostly detected when it has caused damage to important body organs like the Heart, brain or kidneys. This will eventually result to complications such as kidney failure, stroke and heart diseases (Musinguzi *et al.*, 2018).

High blood pressure has been shown to account for a minimum of 45 percent of mortality due to heart disease and approximately 5 percent mortality resulting from stroke (WHO, 2013). Apart from causing of mortality and morbidity, rising medical claim trend has been shown to be a worldwide trend and a challenge when it comes to offering of affordable universal health care (Waltson, 2014). A Kaiser survey shows that health insurance has steadily increased to be the most largest cost happening for most of companies, and that cost for coverage of a family shot up to 131 percentage from the year 1999 (Baicker *et al.*, 2010)

Non communicable diseases represent a major problem of the public globally and their rising importance occurrence in Africa accompanied with diseases considered as infectious is of particular concern. It has been studied that non-communicable disease are increasingly occurring among Africans and only diagnosed at late stages (Nkyi, 2017). Elevated blood pressure is usually a warning that sufficiently great lifestyle

changes are required. Individuals and communities need to know why blood pressure is dangerous. For those who already are diagnosed with the condition it's paramount that they know how to control and manage it in order to avoid complications (Nkyi, 2017).

Lifestyle modification is non-pharmacological therapy that comprises of the following; approaches on diet to stop hypertension (DASH) diet, decreasing of body weight among overweight, reducing of alcoholic intake, smoking cessation and physical activity as recommended by World Health Organization (WHO 2013). Compliance to lifestyle modification strategies is a widespread concern in conditions considered chronic such as hypertension, and is influenced by certain factors. These include; socio-economic factors, individual's health status, current treatment, cognitive factors, relationship amongst people and personal factors (Uwaegbulem & Nkeiruka, 2017). Although the value of lifestyle interventions in control and management of patients who are already on anti-hypertensive drugs has not been widely studied, evidence available shows that this intervention is promising (Bacon, *et al.*, 2015). The findings of the above research further showed that a single lifestyle intervention alone such as regular exercise alone lowered the Diastolic Blood pressure and this lead to regression of conditions such as left ventricular failure in a study of American- African population with Blood pressure which is uncontrolled. This shows that lifestyle modification intervention contributes significantly to the control of blood pressure and the prevention of its complication such as Heart failure, Kidney failure and Cerebral Vascular Accidents.

Adhering to treatment and modification of lifestyle are important measures and therefore, public awareness need to be increased on lifestyle modification strategies and reason to adherence emphasized. An understanding these factors is known to be an important tool to influencing the health behavior of the population. Motivational interviews have shown excellent results in improvement of adherence of patients and participation of the intended audience. This measure can be very effective when primary health care approach is applied (Uwaegbulem & Nkeiruka, 2017). High income countries have started to reduce the burden of hypertension in their population

through strong public health policies such as reduction of salt in processed foods (WHO, 2013).

A study in Pakistan showed that out of 50 participants 20 were females and the remaining were males (Muradi, *et al.*, 2017). This showed that male respondents were more affected by hypertension than their female counterparts. In the study, out of 50 participants 84% respondents' implemented lifestyle modifications to maintain their blood pressure and only 16% respondents did not implement any lifestyle modification to maintain their blood pressure. A small percentage of participants, (40%) did not follow any specific diet. Only 38% participants said that they performed regular exercise as recommended. It was recommended that hypertension can be prevented and treated if people adhered to a healthy lifestyle like taking low sodium and fat diet, performing physical activities and avoiding sedentary lifestyle. Knowledge should be provided to modify their lifestyle. Controlling hypertension will also help to reduce the burden of non-communicable diseases in Pakistan (Murad, *et al.*, 2017).

In Africa research has revealed that there is overall poor control of hypertension that is found in the region and this even involves those subjects that knew their status and those that are on treatment. In general, it has been shown that the women had a better control status than the men (Kayima, *et al.*, 2013). There are low levels of awareness and treatment of hypertension and even lower levels of control among the respondents. It was proposed that a tailored study or research was necessary in order to reveal the specific reasons behind the low levels of awareness and treatment, and most important on control, in order to inform policy formulation. This would be beneficial in the improvement of outcomes of hypertensive patients in Africa (Kayima *et al.*, 2013).

In sub-Saharan Africa more than 125 million people are expected to have hypertension by year 2025. While numerous drugs and combination therapies have emerged in the market for purpose of reducing blood pressure, it is evident that control of high blood pressure has remained low as extrapolated from persistently high level of hypertension prevalence rate. Most of the patients diagnosed of

hypertension are put on medication for the control of their blood pressure. The use of lifestyle modification strategies have not been fully implemented in most set ups in Sub-Saharan Africa (Nkyi, 2017) .

In Nigeria, Statistics revealed that members of staff demonstrated significantly high levels on knowledge about the complications brought about hypertension while the knowledge about the risk factors of the disease and the attitude towards it was showed to be still low (Abdullahi *et al.*, 2011). On the other hand, the level of education was shown to influence awareness of hypertension complications and knowledge of its risk factors in a significant manner. Screening that is done on job and educative programs are important avenues of improving knowledge about hypertension at the work-place (Abdullahi & Amzat, 2011).

Although the cause of hypertension is not known, Promotion of awareness on proven risk factors of hypertension is considered as an important start point in preventing high levels of morbidity and mortality which results from hypertension related cardiovascular diseases. These diseases complicate easily and lead to high blood pressure related morbidity and mortality (Barrino, 2014).

Knowledge about hypertension and its management influences blood pressure control in patients with hypertension. However, studies have shown inadequate knowledge among various communities. Most patients are not knowledgeable on management of hypertension in a holistic approach and especially on lifestyle modification strategies (Okwuonu, Emmanuel, & Ojimadu, 2014). However, many hypertensive patients may not have symptoms to cause them to seek assistance from a health profession, this eventually result in delays thus causing increased mortality from complications of hypertension. Since high blood pressure do not present with pain, it takes long for a patient to realise they are suffering from high blood pressure (Okwuonu, *et al.*, 2014).

An important aspect of promoting optimal health seeking behaviour is to establish those factors that enable and also prevent people from making healthy choices in either their lifestyles or in their use of medical care and treatment. Once the factors

are predetermined, it is easier for the health care providers to sensitize the public on health seeking behaviour for early diagnosis and treatment (Patil *et al.*, 2016).

In Ghana, above 95 percent of participants involved in a study showed that the level of knowledge on risk factors, causes, clinical presentation, prevention and the treatment of hypertension to be poor (Anowie *et al.*, 2015). Occupations was shown to impact on the knowledge levels, whereby those participants who worked had more knowledge on the condition compared to those who had no occupation or regular jobs. Hypertension's association with low levels of awareness, drug treatment, and blood pressure control identified in past studies still exist within current hypertension populations. Prevention strategies that targets populations such as reduction in intake of salt and integrating care and treatment of hypertension into primary care need to be evaluated (Anowie & Darkwa, 2015).

A number of risk factors predispose a hypertensive individual to uncontrolled hypertension leading to complications. These complications include obesity, excessive salt intake which increases blood pressure, stress which produces chemical substances that cause generalized vasoconstriction, oral contraceptive which contains oestrogen that causes salt retention that increases the volume of blood. Others include sedentary lifestyle which has the tendency of increasing body weight and directly raises blood pressure, increase in the levels of plasma lipids particularly cholesterol, excessive alcohol consumption which increases blood pressure and tobacco use (cigarette smoking) that contains nicotine which is known to cause narrowing of the blood vessels (Nkyi, 2017).

In an effort to promoting health seeking behaviours, patients need to possess adequate knowledge on the above-mentioned risk factor so as to control the hypertension disease. Ferguson *et al.* (2011) further explains that knowledge of hypertension disease and its complication is vital in initiation of care and is associated with reduced hypertension related complications and mortality. Knowledge and the attitudes towards health and illness affect the utilization of health care services by individuals and community. Therefore, the health seeking behaviour of the people suffering from hypertension depends on information accessible to them (Ferguson, *et al.*, 2018).

In Ethiopia, hypertension management was influenced by socio-demographic characteristics such as health information, education and occupation .Poor knowledge of hypertension was realized in two hundred and seventy-five (71.8%) participants while poor practice was demonstrated in three hundred & twenty three (84.3%) of the respondents. There was an association between level of knowledge and the practice of lifestyle modification strategies. The knowledge level influences the management of hypertension (Kaza & Shifa, 2016).

Health seeking behaviours, which are actions that reduce impact and progression of an illness, are mainly influenced by manifestations of symptoms. It is only when the patients manifest with the signs and symptoms of high blood pressure that they start practicing the lifestyle modification strategies and seek health care services. Hypertension like other non-communicable diseases do not present with pain in initial phases, therefore, patients get late diagnosis of the disease (Ferguson *et al.*, 2018).

Scientific evidence shows that healthy lifestyle in combination with other therapies is a great way to manage hypertension for people with high blood pressure. Modifications in lifestyle such as exercises and modification in diet have demonstrated efficiency in lowering blood pressure in patients with hypertension who are not on treatment and is usually first line action for treating high blood pressure (Bacon, *et al.*, 2015). Effective lifestyle modification has been shown to lower blood pressure by at least as much as a single antihypertensive drug. A decrease in as low as 2mmHg in the diastolic blood pressure has been showed to decrease prevalence approximately by 17%,coronary heart disease risk by 6% and 15 % of stroke (Nicoll, 2010). Effective management of hypertension requires/warrants knowledge of lifestyle changes/modifying such as control of weight, alcohol consumption limitation, increment in level of physical activity, increase in consumption of fruit and vegetables, reduced fat intake and smoking cessation (Bacon *et al.*, 2015).

In the past decade Kenya is experiencing an epidemiological shift in its burden of disease from communicable to non-communicable conditions resulting in a double load of disease (Ministry of Health, 2018). Non-communicable diseases (NCDs) include cardiovascular diseases, cancer, stroke, chronic respiratory disease, and

diabetes. Unlike infectious diseases such as malaria, tuberculosis, and HIV, non-communicable diseases cannot be passed from individual to individual (Ministry of Health, 2018).

In rural parts of Kenya, one study estimated prevalence of hypertension to be 21%, of these a majority of participants (83%) had no awareness of their condition and only 3% were on successful treatment. Another study in Mombasa, the second largest city in Kenya, demonstrated 32% prevalence of hypertension and only 53% of the individuals had adequate knowledge about the condition (Ministry of Health, 2018).

Based on data obtained from health information system indicates that in Imenti North Sub county there were 3,593 cases of hypertension reported in 2013, 4419 cases in 2014, 3774 cases in 2015, 3,728 cases in 2016 and 2570 cases in 2017. This shows that the number of individuals suffering from hypertension has been persistently high (MoH, 2018).

In Imenti North Sub County, there are about 3616 cases of patients with hypertension. Despite numerous drugs and combination therapies to manage blood pressure, control of high blood pressure remains low as extrapolated from persistently high level of hypertension prevalence rate. It is clear that high blood pressure requires holistic approach to patients. The persistent high level of prevalence rates may be as a result of lack or poor complementary management strategies such as lifestyle modifications and optimal health seeking behaviour. The patient knowledge of hypertension in Imenti North Sub County and how they apply other complementary strategies such as lifestyle modification strategies is not well documented (MoH, 2018).

1.2 Statement of the Problem

Globally, hypertension prevalence is on the rise. Hypertension control is a complex issue that involves patients, health personnel and also health system thus a number of factors can influence patient's health seeking behaviour in management and control of hypertension. Efforts to control hypertension and its complication has traditionally focused on pharmacologic treatment, however reliance on drug therapy alone is not complete. It is clear that high blood pressure requires holistic approach to patients.

Although there are several known guidelines for management of hypertension. Where the patient blood pressure is above 160/100 mmHg, lifestyle modification and pharmaceutical interventions are administered. Previous studies have suggested that lack of knowledge and poor patient adherence to recommended therapy such as lifestyle modification are possible reasons for low rates of blood pressure control.

Cases of hypertension remains persistently high in Imenti North Sub County despite compliance to a range of drugs administered. This may be as a result of lack or poor complementary management strategies such as lifestyle modifications and optimal health seeking behaviour. The patient' knowledge of lifestyle modification in Imenti North Sub County and how they apply complementary strategies such as lifestyle modification strategies is not documented. Hence there was need for this study.

1.3 Objectives of the Study

1.3.1. Broad Objective

To establish health seeking behaviour and lifestyle modification strategies practiced in management of hypertensive patient in Imenti North Sub County.

1.3.2 Specific Objectives

- i. To evaluate the patient's knowledge on lifestyle modification strategies in Imenti North Sub county
- ii. To identify lifestyle modification strategies practiced among hypertensive patients in Imenti North Sub County.
- iii. To determine factors affecting health seeking behaviour in hypertensive patients of Imenti north Sub county

1.4 Research Questions

- i. Are hypertensive patients knowledgeable about lifestyle modification strategies?
- ii. To what extent do patients practice lifestyle modification strategies?
- iii. What are the factors affecting health seeking behaviour of patients?

1.5 Significance of the Study

The results generated from the study helped in identifying gaps in knowledge which will be useful to the county government and other health related organization in policy formulation on control measures of hypertension in the community. The results in this thesis will also be useful to health care providers and health educators who may want to embark on further enlightenment campaigns on control measures of hypertension and also plan hypertension intervention programs. Health personnel such as Doctors, Nurses and health promotion officers may use the results of the study to plan and teach affected adults on positive healthy lifestyles for optimum well being. Results from the study are also expected to increase the knowledge of HTN patients about lifestyle changes and health seeking behavior required in control of Hypertension. The findings will also be used as a baseline study for other studies.

1.6 Operational Definition of Terms

Operational definition of terms defines a construct or variable in terms of specific processes or measurements.

Knowledge: Information that an individual correctly knows what hypertension is and the prevention measures in averting the development of HTN complications.

Practice: - This is the habit that an individual with hypertension carries out in his/her daily life to control hypertension

Good Practice: When patient respond correctly to all practice questions.

Poor Practice: When patient responds wrongly to one or more practice questions

Health Seeking Behaviour: personal actions to promote optimal wellness.

Hypertension: Increased in systolic and diastolic blood pressure above 140/90mmhg as diagnosed through a sphygmomanometer

Hypertensive Patients- An individual who have been diagnosed with elevated blood pressure by a health worker.

Lifestyle Modifications Strategies: weight reduction, salt restriction, abstaining from alcohol, smoking cessation and physical activity

Hypertension Control: An individual with a systolic blood pressure of equal to or less than 140MmHg and diastolic blood pressure of equal to or less than 90MmHg as diagnosed through a sphygmomanometer.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction to reviewed literature on hypertension

In this study, literature on hypertension was guided by the study objectives. The objectives included; establishing patients' level of knowledge on lifestyle modification strategies used in management of hypertension, to identify lifestyle modification strategies practiced by hypertensive patients in management of the condition, and identify health seeking behavior among hypertensive patients. The review starts by presentation of general view on hypertension management strategies then focuses on specific lifestyle modification strategies. Studies have shown that huge benefits in public health scale can be brought about by even the slightest decrease in blood pressure. Lifestyle modification strategies have been proven by current research as a significant step in control of blood pressure. These lifestyle modification strategies involve practical factors that can be practiced in order to achieve optimal blood pressure; dietary modification such as low sodium intake, doing exercises, smoking cessation and meditation. Health care providers play a vital role in counselling, educating and encouraging patients on the benefits of these modifications and their impact in overall health. (Alsinani *et al.*, 2018).

Primary prevention of cardiovascular disease is a significant step in reduction of morbidity and mortality in the community. Increasing awareness of hypertension disease through health messages on its management and effective treatment is a point of focus. Many studies have been conducted globally, but only a few publications have been done which discusses on risk factors for poor blood pressure control among hypertensive patients. According to Kisokanth *et al.*, it has been suggested that patients' knowledge on hypertension and its management as well as physician counseling on a healthy lifestyle and self-care have an independent effect on hypertensive patients' compliance with the recommended lifestyle behaviors. Factors associated with poor control of hypertension are modifiable through tailored, culturally appropriate patient education and treatment strategies (Kisokanth *et al.*, 2016)

2.2 Knowledge on Lifestyle Modification Strategies

Hypertensive patients need to be aware of the risk factors of hypertension which can be modified. This will assist in bringing necessary modification in lifestyle behaviours'. The results in this study emphasized on regular check-ups in patients having high blood pressure (Ahmed *et al.*, 2014). When high blood pressure has been confirmed it is paramount that lifestyle changes are instituted where appropriate; weight reduction if body mass index is $\geq 25\text{kg/m}^2$, limiting of salt intake to no more than one teaspoons day, limiting of alcohol intake to not more than two and one standard drink for men and women respectively in a day, cease from use of tobacco, promotion of a balanced diet which is low in saturated fats and sugars, low fat dairy products, diet high in fibres, fruits, vegetables and unrefined carbohydrates and regular aerobic exercise of 30-60 min on most days of the week (Ferguson, *et al.*, 2018). In terms of socio-demographic, on marital status the widowed were 16 times more likely to be hypertensive than those never married. With regards to smoking status, the current smokers were approximately 3 times more likely to be hypertensive than those who do not smoke. Increasing BMI was also an independent predictor for hypertension; the obese had 4 probability to be hypertensive than those with normal weight. Those participants with high waist circumference were 2 times likely to have hypertension than those with normal waist circumference. This study recommended instituting of awareness programs on risk factors (Awino *et al.*, 2016).

2.2.1 Risk factors

Risk factor according to (Ministry of Health, 2018), is a factor causally related to a change in the risk of a relevant health process, outcome, or condition. Examples of types of risk factors is that they may be a socioeconomic characteristic, personal behaviour or lifestyle, environmental exposure, inherited characteristic, or another trait. Risk factors for human health often have individual and social components; even when individual and social risk factors can be separated, they often interact. A determinant that can be modified by intervention is a modifiable risk factor. Once the risk has been determined the patient can modify it to manage the disease or condition (Bacon *et al.*, 2015).

Conceptualized risk factors are genetic, physiological, behavioural and socioeconomic characteristics of individuals that place them in a cohort of the population that is more likely to develop a particular health problem or disease than the rest of the population (Ferguson, *et al.*, 2018). Risk factors of hypertension are identified factors, characteristics or behaviours which exposes adults to the risk of developing hypertension such as tobacco smoking, inactivity, excessive alcohol consumption, high salt and high fibre diet, age and genetic factor which increase the chance of hypertension to occur in adults (Ferguson *et al.*, 2018).

Modifiable risk factors of hypertension are those elements which can be controlled and the control of these modifiable risk factors is what is known as lifestyle modification strategies. Modifiable risk factors can be altered. This includes characteristics such as weight, intake of salt, alcohol consumption, stress management and physical exercises. In a study conducted on lifestyle factors in hypertension, results showed that hypertension was higher in those people who were smokers, ex-smokers and those with and physically inactive persons (Abed & Haddaf, 2013). Various studies have been carried out in developed and developing nations on Knowledge on Hypertension and these have showed that the level of knowledge on hypertension in their population is low. A study in United Kingdom general public population in London demonstrated a poor understanding of Blood pressure or hypertension (Golub, Fontananosa & Bauchner, 2013).

Non-modifiable risk factors are attributes or elements in a person that are not able to be changed or adjusted, hence they are out of a person's control and little or nothing can be alter them; such factors include genetic composition, sex, age, race and family history.

Age is one of the risk factors of hypertension that is considered as non-modifiable. In humans age is considered a normal process that results to a decrease in physiological functioning of all organ systems (Bufford, 2016). Inflammation has been documented as a consistent biological feature occurring in aging. Biomarkers of inflammation that are commonly associated with aging are elevated interleukin-6, tumour necrosis factor alpha and C reactive proteins (Svetkey *et al.*, 2011). Prolonged elevation of

inflammation mediators result in chronic production of reactive oxygen species, and this is thought to lead to physiological dysfunction and diseases such as hypertension (Dinh *et al.*, 2014). A report by (WHO, 2013) states that approximately 2.3 million deaths occur as a result of high prevalence of hypertension. The findings from this study indicate that those adults who are within the age bracket of 40 up to 49 years old were at a greater risk of developing hypertension disease. This study by WHO indicated that as one advances in age there is an increase in the likelihood of developing hypertension.

Gender is a non-modifiable risk factor to development of hypertension. Researches done have offered various findings on this aspect. In one study the author illustrated that men over 65 years of age have higher levels of hypertension compared to women (Everett&Zajacova, 2015). The findings further revealed that the trend is remarkably seen in early adulthood among 18-29 year olds, whereby 1.5 percent of men compared to 5 percent of women had hypertension. Hypertension frequency is higher in men than women up to about the age of fifty years, but the contrary is the case at older ages. Gender differences in hypertension which have been found to exist in animals and human population are as a result of biological and behavioural factors. The biological factors implicated for this become distinct during adolescent stage (Sandberg K., 2012). The author further explains that these biological factors will persist through the adulthood phase until menopause stage in women. Similar findings have been shown by Maranon and Reckedhoff (2013) who gave details that after menopause, the occurrence of hypertension disease is less in women than in men. Women are noted to have a higher incidence of hypertension and this is attributed to the disappearance of oestrogen hormone which provides protection against heart disease and high blood pressure (Reckedhoff, 2013).

Family history is a significant non-changeable risk factor to development of hypertension. Studies indicate that history of hypertension in the family has a significant contribution to the development of not only hypertension but also other cardiovascular diseases compared to those with no family history (WHO, 2013). In a Framingham heart study which was done across three generations, interesting insight was provided on this issue. The studies showed that elevated blood pressure noted in

grandparents apart from the parents is associated with the risk of developing the same condition up until the third generation (Niiranen et al., 2017). Several mechanisms have been suggested to explain the relationship of hypertension and family history. One of these is that some families have increased sodium reabsorption by the proximal renal tubules (Dilini *et al.*, 2015)

Hypertension non-modifiable risk factors cannot be altered although awareness of these risk factors is important. The modifiable risk factors however are elements, exposures, characteristics or life style patterns that can be altered in order to prevent development as well as complication of the disease. They include; body weight, salt intake, smoking, body physical exercise, alcohol consumption and weight monitoring (Ibekwe, 2016).

Awino (2016) conducted a study in a sub county hospital called Yala, in Kenya. The objective was to determine awareness Status and Associated Risk Factors for Hypertension among Adult Patients attending this hospital. The study was a cross-sectional one and involved 393 participants (144 males and 249 females) 18 years and above. Various data collected in addition to demographics comprised of social economic and history of exposure to various probable risk factors for hypertension. . The study showed that hypertension prevalence in the study participants was at 36.9%. Advancement in age was noted as a factor that increased the chances of development of hypertension. In addition respondents of 40-49 years old had 10 fold chance to have hypertensive compared to under 30 years (Awino, *et al.*, 2016).

2.2.2 Excess weight gain in hypertension

Excess weight promotes hypertension, patient who are hypertensive and gain weight are at risk of uncontrolled blood pressure and its complications. It was revealed in a study by Parker et al. that increase in weight increases work load in the heart which in turn increases heart rate. These factors combined increase or lead to uncontrolled blood pressure (Parker, *et al.*, 2016). This study revealed a strong statistical connection between increasing body mass index (BMI) percentile and increases in blood pressure percentile, with risk of incident hypertension associated primarily with obesity (Parker *et al.*, 2016).

2.2.3 Excess salt Intake in Hypertension

Hypertension has been associated with intake of excess salt. Sodium is one of the most important electrolyte in the body and necessary for proper functioning of nerves and muscles. It is also vital in maintenance of water and fluid balance in the various body compartments. Research has shown that the consumption of sodium which is the major component in salt is higher than what is needed for physiological functions in most of the countries which is greater than 2g /day (Alburto, *et al.*, 2013).

Moreover to being a common constituent in table salt, sodium is also found in other dietaries like milk, fish, soy sauces and processed foods. Processed foods have been known to contain a substantial amount of sodium. Therefore, a diet that is comprised of a large portion of processed foods and small portion in fresh fruits and vegetables is considered to be high in Sodium. This places an individual at a risk of elevated blood pressure and other cardiovascular diseases (Alberto, 2013).

Many individuals find salty foods good to taste. However excess intake presents a challenge to the kidney for its excretion, salts aides in retaining water in the body and this increases blood volume. This process is regulated in the body by the Angiotensin Aldosterone Renin system, when there is increased retention of salt in the body. The kidneys produce renin which leads to release of aldosterone from the Adrenal glands. Aldosterone release leads to reabsorption of water in the renal tubules which lead to increase in blood volume and thus increases blood pressure. When sodium intake was reduced; systolic blood pressure and diastolic blood pressure were also reduced (Alberto, 2013).

Another study on lifestyle modification strategies by Mancia *et al.*, (2013), showed that low sodium intake had been found to lower blood pressure, salt has sodium and the sodium has water retention properties. It was explained in the same study that excess salt intake retains more water in the body increasing circulating blood volume. This in turn increases the blood pressure significantly. Blood pressure increases with increase in salt intake (Mancia, *et al.*, 2013). The study reveals that increased levels of salt in blood will cause water from the surrounding cells to shift into the blood vessels in order to dilute the salt. This movement leads to increase in blood volume and this

further result to increase in blood pressure due to the increased effort of the heart to pump large volume and also increase pressure as blood flows through blood vessels.(hypertension) (Mancia, *et al.*, 2013).

2.2.4 Cigarette smoking in Hypertension

Cigarette smoking is a major element of danger for cardiovascular disease (CVD) such as hypertension and its top on the list cause of death worldwide (akcay and Yuksel, 2015). Cigarette is known to contain chemical nicotine, which causes the blood vessels to contract (vasoconstriction) and this eventually lead to increased cardiac output, hypertension, and stroke. The resultant to this is rise in blood pressure and the cardiac muscles of the heart work harder to pump increased volumes of blood through the already damaged lungs. Mancia, Grassi and Redon (2013) contributed that nicotine that is found in cigarette and carbon monoxide from tobacco have provoking effects in the body by increasing the level of adrenalin and this causes constriction of the arterioles leading to elevation in blood pressure (Mancia, *et al.*, 2013)

Smoking is mediated with three constituents which are nicotine, carbon monoxide and oxidant gases. Nicotine is said to bind to sympathomemetic receptors which are cholinergic in nature and this stimulates the production of catecholamines. The effects of catecholamines in the body are diverse affecting various body systems. In the cardiovascular system this leads to increase in heart rate, blood pressure, myocardial contractility which eventually results to increase workload of the heart and demand of oxygen increases (Rigotti & Clair, 2013). They further explained that Carbon monoxide is produced during combustion and this also occurs when smoking. The carbon monoxide will avidly bind to heamoglobin in the body, which forms carboxyhaemoglobin. This complex molecule will not dissociated easily to release oxygen to body tissues and eventually these results to hypoxaemia which precipitate ischaemic attacks in the body (Rigotti & Clair, 2013).

The third constituent is oxidant gases, such as nitrous oxide and free radical. These will lead to inflammation of endothelia tissues and lipid formation. Lipid formation has been attributed to narrowing of blood vessels by formation of atheromatous

plaques. This narrowing increase the peripheral resistance of blood vessels eventually results to high blood pressure (Adeloye & Basquill, 2014).

2.2.5 Stress in Hypertension

Stress is a danger factor to development of hypertension for it triggers the sympathetic portion of the autonomic nervous system and the nervous-pituitary-adrenalin system. Once the sympathetic system has been stimulated, release of epinephrine and norepinephrine causes vasoconstriction which increases blood pressure (Yaribeygi, *et al.*, 2017). Yaribeygi *et al.*, (2017) explained that emotional changes that occur during periods of stress the body system will trigger the body to produce neurotransmitter substances known as catecholamine and adrenalin. The presence of these substances results to vasoconstriction (contraction) and narrowing of the blood thus increasing blood pressure, an elevation in blood lipids, disorders in clotting mechanism, vascular changes and atherogenesis. Reducing one's energy expenditure causes suppression of lipoprotein lipase, an enzyme responsible for the magnetization of triglycerides and the building up of high-density lipoprotein cholesterol (Yaribeygi, 2017). Social network support has been shown to enhance communication. Social networking decreases feeling of loneliness which oftenly result to physiological dysregulation such as increase in inflammatory process and blood pressure (Erin & Linda, 2012). In a study done among employees in Kenya, analysis of relationship of life stressors and high blood pressure showed that respondent with issues in parenting had increase proportion of hypertension(39%) while those who indicated otherwise were 15% lower (Onyango *et al.*, 2017).

2.2.6 Sedentary Lifestyle in Hypertension

Sedentary lifestyle is a medical term that is commonly used to describe lifestyle with minimal or absent physical activity. Sedentary lifestyle can be dangerous to health just as other risk factors such as smoking or excessive consumption of alcohol. Nowadays, sedentary lifestyle is common because of technological advancements. With invention of combustion engine, more people are driving to work other than walking. Use of mobile phones has made communication easier, so no need to walk long distances to visit friends or relatives (Alsinani, *et al.*, 2018).

Mobile technology has also taken hold of many people whereby people spend prolonged hours in social media other than involvement in outdoor activities. Long period of sitting is an additional factor that reduces insulin secretion, inhibits the uptake of blood glucose by skeletal muscles and result of this is increase in pro-inflammatory cytokines, known to be associated with the happening and advancement of many cardiovascular disorders. Long periods of sitting is connected to adding of weight and greater risks for abdominal obesity, dyslipidaemia, hyperglycaemia and elevated blood pressure among the adult population (Mancia *et al.*, 2013).

2.2.7 Obesity in Hypertension

Obesity is the accumulation of fat and weight in the body. Obesity is known to have adverse effects on a person's health. The proportion of an individual body weight is normally calculated as BMI. This is expressed as the ratio of a person's weight in measured in kilograms to square of height taken in meters (WHO, 2013). Obesity has been known to increase risk of developing hypertension disease, coronary artery disease and also some cancers (Ruseski, 2014). Obesity is a notable factor that is associated with high blood pressure as ascertained by a study done on Adolescents and Children (Parker, *et al.*, 2016). This study was a retrospective cohort of ages 3- 17 years. The researcher found out that the largest increase in BP percentile was observed in those children who became obese or maintained Obesity. Obese children of between 3-11 years were seen to have a twofold probability to hypertension development compared to those children who had weight within the normal ranges. The very obese children and adolescent had a more than fourfold likelihood to hypertension development in relation to those with normal weight. Even though genes can put one at a risk of high body weight, the balance of energy intake is vital in order to maintain the ideal Body Mass Index (BMI). BMI calculation is by a person's weight and Height. As suggested by the World Health Organization the normal BMI is in the limit of (18.5 -24.9). BMI of 25 and above up to 29.9 is considered overweight. BMI of equal to or above 30 is considered Obese (Appel, 2003).

2.2.8 Alcohol Consumption in Hypertension

Excess alcohol intake has been linked to a number of medical Conditions and also Social problems. Hussain, *et al.*, (2014) has explained that Several possible

mechanisms of high alcohol consumption such as central nervous system malfunctioning, poor function of the baro-receptors, sympathetic activity exaggeration, triggering of the renin-angiotensin-aldosterone system, high cortisol levels, elevation in vascular reactivity due to a shift in intracellular calcium levels, stimulation of blood vessels to release vasoconstrictors and absence of blood vessels relaxation due to oxidative injury and inflammation of the inner layer resulting to hindrances of endothelium-dependent nitric oxide making (Husain, *et.al.*, 2014).

2.2.9 Level of Knowledge on Hypertension

On level of knowledge, hypertensive participants in the survey had little knowledge of their own blood pressure and were unable to estimate it within acceptable levels. Poor knowledge on risk factors was found to result to uncontrollable blood pressure despite taking of drugs. Studies have shown that educational programs on risk factors prevention have improved blood pressure control (Adeloye and Basquill, 2014). Anowie *et al.*, (2016), studied hypertensive patients' knowledge, attitude and practices and report patients had low level of knowledge, attitude and practices but these improved tremendously after health interventions were put in place. Prior to the intervention, only 16.58% of the population under study had good knowledge, 30.89% good attitude and 26.76% good practice towards hypertension respectively of which, after intervention rose to 75%, 78.23%, and 66.18%, respectively. Illiteracy and poor socio-economic class of participants were a contributing factors to the poor scores for knowledge attitude and practice. Gender was also realized to have an effect on the study whereby, males had higher knowledge, attitude and practice scores compared to females (Anowie *et al.*, 2016).

In another study on hypertensive patients' knowledge, the researcher found that patients had poor knowledge but these improved significantly after health interventions were put in place (Jack *et al.*, 2018). Prior to the intervention, only 16.58%, 30.89%, 26.76% of the s population under study had good knowledge, good attitude and good practice towards hypertension respectively. After intervention this was noted to have improved to 75%, 78.23%, and 66.18%, respectively. Another study by (Azubuike & Kurmi, 2014) report similar findings when they studied some rural Nigerian women who mostly had some exposure to hypertension information

but still lacked some knowledge in relation to specific factors associated with hypertension. Out of the 252 respondents studied, 80.6% had heard about hypertension (Azubuike *et al.*, 2014).

Poor Knowledge on hypertension was noted in the country of Ghana cape coast town amongst hypertensive patients. 95 percent and above of the study participants showed lacking knowledge levels on the risk factors, causes, clinical presentation, prevention and treatment of hypertension. Attitudes and perceptions towards the condition were highly negative at (98%). Kasa and Shiva (2017) conducted another study to assess extensiveness and hypertension knowledge among Bahir Dar community. In general, 275 (71.8%) of the study participants had poor knowledge on hypertension management and the remaining had good knowledge on hypertension management amongst them (Kaza & Shifa, 2016).

A study done in India on knowledge risk factors and associated co-morbidities in Hypertension patient showed that 287 (84.4%) patients out of 340 hypertensive patient had poor score of knowledge on hypertension. Knowledge on hypertension increases practice of lifestyle modification strategies (Patil *et al.*, 2016). In the above study, low knowledge is associated with low socio-economic class, illiteracy; knowledge was more in males compared to females. In another study done in Nigeria amongst the staff of university of Ibadan, findings showed that 84% of respondents believed that hypertension can cause stroke, while 88% agreed that severe hypertension can lead to heart attack and eventually death. High level of knowledge among the participants was connected with good practices in lifestyle modification strategies (Azubuike and Kurmi, 2014).

A study done on knowledge, perceptions, lifestyle behavior changes and challenges that face hypertensive patients showed that general knowledge about hypertension was wanting. Patients demonstrated poor understanding some of the risk factors and their defining characteristics, presentation and lifestyle modifications in hypertension. moreover, there were a higher percentage of poor regard on lifestyle behaviors modifications among the hypertensive patients (Seham & Mezayen, 2015).

Poor knowledge on lifestyle modification strategies contribute to poor practice of the strategies. This was revealed in a study done in Zambia where the level of knowledge in management of hypertension was positively collated with practice of lifestyle modification strategies. The patients who knowledgeable on management of hypertension; practiced good lifestyle modification strategies (Jack *et al.*, 2018).

Control of hypertension was noted to have no correlation with individual awareness on healthy lifestyle nor does the awareness correlate to adherence to taking antihypertensive medication. The results of this study therefore showed that awareness of hypertension did not improve people's lifestyle. However, the participants who are aware and not using any antihypertensive drugs are able to have their blood pressure under control in a better manner compared to those using medications (Akbarpour *et al.*, 2018).

In Mangalore India, a study was conducted on patient perspective about hypertension. The study revealed that 45% of hypertensive patients studied showed poor general knowledge on hypertension management while 7% had good knowledge on lifestyle modifications practice, the highest perceived barrier was lifestyle modification practices related to hypertension was lack of knowledge (Jolles *et al.*, 2013).

In Vietnam Hypertension is of great concern in public health. Occurrences of hypertension among adults was reported to be on the high side whereas, the proportions of hypertensive patients who were aware, treated and had controlled blood pressure were extremely low. These results give the conclusion that prompt measures are needed for development of national strategies to improve prevention and control of hypertension (Son *et al.*, 2012).

A study done to assess levels of knowledge and practice of lifestyle modification strategies among individuals previously diagnosed with hypertension disease, revealed that among the participants, 51.4% of the participants under study had received a health talk on lifestyle modification in blood pressure control from alternative sources other than health care providers. Therefore, a higher number of people were knowledgeable on lifestyle modification as an approach in blood pressure

control in comparison to an earlier study in Nigeria where of the 200 participants, none received a health talk on lifestyle modification thus resulting to misconception and poor knowledge level and practice of lifestyle measures (Okwuonu *et al.*, 2014).

2.3 Practice of Lifestyle Modifications Strategies

It is possible to lower blood pressure levels by practicing lifestyle modification strategies, and this is achieved by controlling of risk factors of hypertension. Lifestyle modification considered the initial step of intervention for hypertensive patients (Murad *et al.*, 2017).

Several studies have been conducted in different countries concerning lifestyle modifications practices. Onyango *et al.*, (2017) conducted a study on employees at a call center in the city of Kenya, concerning the occurrence and associated factors of hypertension. They collected data comprised of assessing of employees weight and height to aid in determining Body Mass Index (BMI), measurement of blood pressure and behavioral risk factors and lifestyle practices (Onyango *et al.*, 2017). On analyzes of the study findings using various analytical methods such as bivariate and multiple regressions, the findings revealed that the percentage of hypertension was notably higher among overweight respondents (32.7%) and obese respondents (60.2%) compared to those respondents who were within normal range of weight (4.0%).

Respondents did not attempt to reduce fat in their diet were highly predisposed at 2.4 times having hypertension than respondents who practiced reduction of fat in their diet. Respondents who occasionally involved themselves in physical exercises had 2.2 likelihood to development of hypertension compared to those who always engaged in physical exercises. Respondents with challenges in parenting were shown to be twice as likely to have hypertension as parents who did not have parenting issues (Onyango *et al.*, 2017). Findings from WHO step survey indicates that obesity is highly prevailing in African countries. Especially consumption of diet considered unhealthy had a notable increase in the number of hypertension in respondents whose intake of fruits and vegetables was less than five serving per day. Likewise increase number of hypertensive individuals was realised among those who did not try to decrease fat consumption in the diet (David *et al.*, 2015)

A study done in Nigeria on whether patients understand their medicine & lifestyle modification in managing hypertension, showed that 60% 62% & 59% of respondents were aware of lifestyle modification strategies of hypertension control such as regular exercise, salt intake reduction and consumption of high fruits and vegetables diet and low fat diet. 38% were cognizant on avoidance of cigarette smoking and 46% were knowledgeable of reduction in alcohol intake (Marfo, *et.al.*, 2014).

Another study done in Ethiopia on factors associated with hypertension and the prevalence rate among adults showed that 19(2.8%) were current smokers of whom 7(38.8%) were smoking at least 10 or more cigarette every day 37% were current alcohol users and 16.9% of respondents were involved in zealous physical activities such as heavy lifting of load. In this study the respondents who were involved in smoking, taking alcohol, living sedentary life and excess salt intake were predisposed to uncontrolled blood pressure (Awoke *et al.*, 2012).

According to a study done in Nigeria on how patient related barriers affect the control of high blood pressure in a Nigerian population, unawareness of modifications in lifestyle and lack of application of these strategies were identified as patient related barriers in hypertension control (Okwuonu, 2014). The study further revealed disparity between the participant's knowledge and practice of relevant measures. Civil servants and those with longer period from the time of diagnosis were found less likely practicing salt restriction. None of socio-demographic variables was associated with practice of regular exercise; however those with high school level education or formal education were not likely to attempt weight reduction (Okwuonu *et al.*, 2014).

In the city of Aksum Ethiopia, a study was carried out to assess treatment and control of hypertension. The study was a qualitative and quantitative, and the sampling procedure was multistage sampling for quantitative and convenience sampling for qualitative. The instrument used for collection of data was a questionnaire for the quantitative and an interview guide for the qualitative data (Gebrihet, *et.al.* 2017). The results showed that the Prevalence rate was very high among adults, however the levels of awareness, treatment and control of hypertension were poor. Other factors that were positively associated with control of blood pressure were; inability to read

and write, failure to consume fruit, physical inactivity, overweight/obesity and unawareness that physical inactivity is a risk factor for hypertension. This clearly indicates that information and awareness strategies need to be formulated and implemented to prevent unhealthy practices and promote healthy lifestyle practices (Gebrihet, *et.al.* 2017)

In a study done in Pakistan, it was revealed those patients, who are knowledgeable on lifestyle modification strategies, were more likely to practice the strategies than those who didn't know about the lifestyle modification strategies. However, in the same study most of the patients didn't take the recommended salt intake and regular exercises (Murad *et al.*, 2017).

Many studies in epidemiology have documented that elevated blood pressure is associated with high alcohol consumption (typically three or more) per day. Clinical tests have also demonstrated that reducing amount of alcohol consumed can lower blood pressure in men who have normal or high blood pressure and are heavy drinkers (Appel, 2003). In a study on hypertension prevention and treatment, it was shown that moderate- to-heavy drinkers, had a small lowering in their blood pressure upon reduction in alcohol intake. Generally, obtained evidence reinforces the recommendation of limitation of alcohol intake to two drinks or less in a day for men and one drink in a day for women. (Appel, 2003)

Patients who have resistant hypertension need to be given information on advantages and disadvantage of lifestyle modifications. Health care providers need to be informed too in order to teach the patients on lifestyle modification strategies (Blumenthal, *et al.* 2015). Because the existing studies on this area are relatively few and were carried out mainly on patients who are not taking antihypertensive, further research is needed to demonstrate if there would be significant improvement or control of blood pressure when lifestyle changes are practiced by such patients. It would be inappropriate to make an assumption that control of blood pressure on patients not taking medication would be equivalent to those with resistant hypertension and adhere to medication (Blumenthal, *et al.*, 2015).

Patients who are non-adherence to anti-hypertensive drugs may not achieve sufficient reduction in blood pressure from lifestyle changes, either. The benefit of lifestyle modification in patients with resistant hypertension remains a valuable yet an unanswered verifiable question that is important to be examined in order to make sure if rigorous, organized lifestyle interventions may be a fruitful option for treatment in these patients. Actually, a recent publication on guidelines on lifestyle changes to reduce cardiovascular risk, by the American Heart Association in connection with the American College of Cardiology emanated that there is insufficient data on the impact of lifestyle modification in treated patients (Blumenthal, et al., 2015)

A study regarding health-related behaviors in Turkey showed that, slightly more than a half (59.6%) of the respondents demonstrated constancy to a low sodium diet, 54.5% reported to not having smoked at all, 53.5% did have a machine for blood pressure at home, however, 52.2% did not assess their blood pressure (52.2%), worthy noting is 64.4% did not determine their blood pressure levels. Regular Exercise was reported by 41.7% of the participants, 86.9% said that they do some walking exercise. However, 58.3% reported to not doing any form of exercise and cited some obstacle, such as feelings of fatigue and stress as one of them. Consistency in taking of medication was assessed by asking the participants how frequent they took the prescribed drugs; above a third of them (38.8%) were consistent) However, the major proportion of the respondents (72.5%) did not have stress at the time of data collection (Alhalaiqa *et al.*, 2017)

Cessation of smoking before 40 years of age has been attributed to reduction in the risk of tobacco-related death by 90%,while quitting at any age decrease the rate of mortality. Stoppage of smoking lowers a smokers' danger of developing stroke and myocardial Infarction. Likelihood of developing cardiovascular diseases is significantly reduced after cessation of smoking. Overall, fifty percent of the heart diseases known, risk reduced within a span of 2 years of quitting (Rigotti & Clair, 2013).However, the smoker who stopped smoking for the last five years has in average the same risk of developing stroke as an individual who never smoked. In the midst of smokers with peripheral arterial disease, stopping of smoking has been shown to decrease the 5 year danger of amputation and more than 10 fold amputation

risk and lowers mortality by among those who smoke and have congestive heart failure, stopping the habit lowers mortality by a third after one year of cessation (Rigotti & Clair, 2013). Quick improvements in blood vessels function and hyper coagulability of blood among the smokers who quit is thought to contribute these public health observations. Smoking cessation after conditions like acute coronary syndrome (ACS) and myocardial infarction is one of the most efficacious measures for secondary prevention of cardiovascular disease (Rigotti & Clair, 2013).

A worthwhile reduction in mortality was observed in a span of 6 months after an acute coronary syndrome among those who quitted smoking, compared with those who continue to smoke. Smokers who stopped the habit after myocardial infarction attack have a 36% decrease in mortality of cardiovascular disease over 2 years compared with those who continued. Cessation of smoking has clinical implication in that it enhances outcomes after surgery. Smokers who quit smoking after surgery, in comparison to those who persist to smoke, betters their survival and decreases their danger of having other procedures. Cessation of smoking lowers the smoker's likelihood of death in comparison with individuals who persist with the smoking habit (Rigotti & Clair, 2013)

Although the cause of hypertension is not known, it has been demonstrated that promotion of understanding of the known risk factors is a vital starting point in elimination of high burden in mortality and morbidity which results from hypertension related cardiovascular diseases. These lifestyle modification strategies help prevent diseases complication and easily reduce prevalence of high blood pressure related morbidity and mortality (Akbarpour, *et.al.*, 2018).

A cross sectional study was conducted in order to assess for risk of Hypertension and other cardiovascular disease risk factors in Cameroon. The sample was seven hundred participants who were selected by random sampling. Socio demographic, blood sugar level, measures of blood pressure, and biometric data were recorded. The results indicated that being physically inactivity, obesity around the abdomen and high blood pressure were the dominant risk factors recording 51.1%, 35.4%, and 20.4%, respectively. High blood sugar levels, consumption of tobacco, excessive weight, and

consumption of alcohol was 5.6%, 8.3%, 9.6%, and 18.1%, respectively (Derew, *et.al.*, 2016).

Knowledge about hypertension and practice of the recommended strategies influences blood pressure control in patients with hypertension. However studies have shown inadequate knowledge among various communities and this affects the prevalence of hypertension among these communities. Most patients are not knowledgeable on management of hypertension using lifestyle modification strategy practice and adhering to medication as prescribed (Okwuonu *et al.*, 2014).

2.4 Factors Influencing Health Seeking Behaviour

Health seeking behaviour are a number of events of corrective actions that a person carries out in order to fix recognized ill health. It usually begins with the defining the feature of the disease, after which a plan for treatment action is formulated. Treatment choice comprises of a multitude of features which are connected to the type of illness and its severity, previous beliefs on the cause of the illness, the scope and the reachability of available treatment options, and their believed efficiency (Akintaro, 2015). Programmes aimed at health promotion worldwide have been based on the argument that provision of information on causation of health problem and options available will be of great assistance towards bringing about a change in behavior of an individual, towards helpful health seeking conduct. The right understanding of health seeking behavior could decrease the late diagnosis, enhanced compliance to treatment and achieve better health promotion actions. (Akintaro, 2015)

In Nigeria, majority of the respondents (64.6%) agreed that seeking care from modern health care facility is usually costly and cumbersome. A little above average (53.2%) disagreed that alternative health care are more effective than modern health care facility. Likewise, majority of the respondents (65.2%) agreed that long distance from modern health care facility prevent them from seeking health care service on time. A large number (62%) also identified lack of money for the payment of hospital bill and other hospital requirements as one of the determining factors for the choice of health care services (Faronbi, *et.al.*, 2017). Findings from the study however, did not show that that culture is a hindrance to health care seeking behaviour. Majority of the

respondents (96.2%) disagreed that culture prevents them from seeking modern health care service. An analysis was performed to predict choice of health care from age, sex, religion, education and income. The results revealed that age and education were statistically significant while income and marital status were not significant (Faronbi, *et al.*, 2017).

Health seeking behaviour is a mix of many factors. In a study done to assess the relationship of health seeking behaviour of women with high blood pressure and their control of by (Anila, 2013), the following factors affecting health seeking behaviour of women were found: knowledge on management of hypertension, availability of health care facility, accessibility to health care facility, availability of hypertensive drugs, attitude for health facility and availability of social support system (Anila, 2013).

A study on factors affecting adherence and health seeking behaviour of hypertension in Uganda revealed that Self-treatment and reachability to antihypertensive drugs having a prescription or not were common. A high proportion of the patients were using counter medication bought over the counter as well as herbal medication. Constant measurement of blood pressure was not routinely practiced. Patients used to go for checkups only when they feel sick (Musinguzi, *et.al.*, 2018).

Factors influencing health seeking behavior were interconnected to health set up and the patient economic and social status as well as organizational environment. The principle system factors were associated with availableness and approach of staff, some staffs took long to serve the patients. Shortage of supplies and medicines was also a predictor in health seeking behavior. The patient influences were related to understanding of the lifestyle modification strategies, perceived severity of the disease, perceived effectiveness of the drugs prescribed, adverse effects experienced when taking the medication, and recognized dread of dependence on medicines for a long time. The economic and social status of a patient had its contribution as well as availability and accessibility of traditional medicine (Musinguzi, *et al.*, 2018).

In turkey, out of total 112 study subjects 34(41.5%) who were diagnosed at private health facilities, Palanivel *et al.* (2015) found in their study that about half of hypertensive patients had been diagnosed by private practitioners. These finding shows the preference toward government health facilities and that the elderly were spending less money from their pocket for diagnosis and as well as treatment of hypertension. About 60% of the hypertensive patients had reported that they missed at least one dose of anti-hypertensive drug during the last one month whereas Palanivel *et.al.* (2015) found in their study that about half of hypertensives missed at least one dose of antihypertensive drug during the last one month (Jain & Sinha, 2015).

Health seeking behaviour is a distinctive occurrence. There are a number of aspects that can have an effect on this behavior, particularly among the elderly persons. A greater number of the participants were in the age of 60-69, above 50 percent of those who took part in the study were male while an average of 60 percent were married. Nine out of ten of the participant were members of the highest caste and were followers of Hinduism , which is considered as the religion followed by majority of people in Nepal (Baral and Sapkota, 2018).

Regarding ability to read and write and having a constant means of income, 64.4% knew to read and write, and 100 percent were in previously in employment whereas, 67.3 % were still in employment. Rise in literacy levels and a reliable job alter the perception of the aged person in acquiring the health care needs and enhances the decision making in looking for medical help from health care providers. A great number of those involved in the study belonged to joint family of which 48.1 % were knowledgeable on the accessibility of health facilities. Therefore, level of knowledge, employment status and age predicted the health seeking behavior (Baral & Sapkota, 2018).

In Nigeria, a study on health seeking behavior revealed that a great interrelated contribution existed between health seeking behaviors to high blood pressure with herbal remedies demonstrating an important contribution. Majority of traders were using traditional herbs to treat hypertension. The study further showed that there is differences in gender when it comes to health seeking behavior, whereby, majority of

the health care seekers were male compared to female. Following which a recommendation was made that coordinated efforts to enlighten the public needed be commenced in order to help create awareness on illness causation (Akintaro, 2015).

A study on occurrence of hypertension, showed generally the prevalence of the disease was at 26.2%. Females were more prevalent 33.3% than in males 16.8% and this was statistically significant. Out of the 80 hypertensive patients, 58 were aware of their hypertension while the rest were unaware. Among the 58 patients who had knowledge of their condition; only 50 were taking medication and out of the 50 hypertensive patients on treatment only 39 took their treatment regularly. These observations re-emphasize the need for tailor-made hypertension awareness programs to address the knowledge gap. It also brings to light the need for follow-up, counseling and monitoring of hypertensive to reduce non-compliance to anti-hypertensive medication (Ingale & Dixit, 2017).

Majority (63.4%) of the population under study detailed whenever they are unwell, they get care from a health setup while, 5 percent outlined that they obtain their care from a medicine vendor. Noticeable is that all respondents reported to utilizing at least two of these provision. Approximately 10 percent of respondents attested to use of traditional medicine, of note is that a low percentage (7.3%) reported to utilize traditional medicine as well as patient vendor medicine (Osamor, 2011). Results obtained from interviewers with crucial informer outlined that the reason for preferring medicine vendors in contrast to attending a health facility was because of quick accessibility, reduced waiting time and low cost. In general, it was obvious that patients with hypertension have other places where they seek care other than established health care units. The discovery from this study has clear suggestion for programme planning and policy formulations for hypertension control and prevention of complications in such kind of settings (Osamor, 2011).

Sibbritt, studied the use of convention and alternative medicine use, the findings showed an interesting phenomena; it was revealed from the studies that conventional and complementary medicine was commonly in use among hypertensive women. Overall, women who had high blood pressure were noted to

incline more on alternative medicine use compared to conventional use. However, those women who were normotensive practiced the use of conventional medicine more in comparison to complementary or alternative medicine. This brings us to the conclusion that health care providers need to incorporate information about complementary and alternative medicine use in their holistic care to hypertensive patients. These efforts are important in order to ensure safe, successful and harmonized care. (Sibbritt, 2016).

Preventive health seeking Behavior was notably connected to academic qualification and administrative status of respondents. Despite the findings showing that greater than 50 percent of respondents are not alcohol consumers, there are other features of preventive behavior practices that had low response. This therefore, requires strategic and well formulated educational intervention in work places for purpose of change of behavior in relation to hypertension prevention. The health care workers should emphasize on general practice of all lifestyle modification strategies (Ikechukwu-Orji, 2017)

Another study carried out in South India found that Social status, education levels, power in the family and bigger community have influence on health seeking behaviour. It was noted that accessibility and costless services were the most familiar explanation of why respondents had preference for public health facility. At the same time, private practitioner were favoured because their care was quality and were easily available (Chauhan *et al.*, 2015).

Age of the respondents, marital status ,educational attainment, employment, stable household income, household size, distance from health facility, transportation, duration of illness, presence of co morbidity, size of family, and perception were connected to health seeking behaviour according to a another study (Shrestha, 2017). A study on factors that affect health seeking behaviour of older citizens in Dharan reported that 35.5% of respondents did not seek health care because of impoverishment and lack of finances, 64% due to lack of knowledge and decline in years, 41% lamented that health care workers had a lacking attitude toward their wellbeing and medical care, 23% cited distance to a health facility and 26.8%

complained of lengthy processes to get treated (Shrestha, *et.al.*, 2017). A another similar study done Africa it was reported that factors related to health system like inadequate hypertension medication and lengthy distance to health institution as affecting health seeking behaviour and control of hypertension (Adeloye & Basquill, 2014).

Perceived severity has been noted as a critical determining element of health seeking behaviour. According to a study done by (Musinguzi, *et.al.*, 2018) in Uganda on factors that have an influence on adherence and health seeking behaviour of Hypertension, patients reported that they did not find it necessary to go to hospital if they felt well and that in case of mild symptoms they treated themselves or went to buy drugs from drug stores. Socio-economic factor was also a determining factor, whereby patients with better socio-economic status had better health seeking behaviour because they could afford cost of treatment at the health care facilities. The study further reported that inadequate services, frequent drugs stock out and concerns on quality attributed to poor health seeking patterns for hypertensive patients (Musinguzi *et al.*, 2018).

Health seeking behaviours, which are actions that reduce impact and progression of an illness, are mainly influenced by manifestations of symptoms. It is only when the patients manifest with the signs and symptoms of high blood pressure that they start practicing the lifestyle modification strategies and seek health care services (Ferguson, *et al.*, 2018). However many hypertensive patients may not have symptoms to cause them to seek assistance from a health profession, this eventually result in delays thus causing increased mortality from complications of hypertension. Since high blood pressure do not present with pain, it takes long for a patient to realise they are suffering from high blood pressure (Okwuonu *et al.*, 2014). An important aspect of promoting optimal health seeking behaviour is to establish those factors that facilitate or hinder people from choosing healthy options in their lifestyles or their use of medical therapies. Once the factors are predetermined, health care providers can easily to sensitize the public on health seeking behaviour for early diagnosis and treatment (Patil *et al.*, 2016).

2.5 Theoretical Framework

Theories play an important role in Health Education research. Debar (2004) argued that theories and models are among the most useful tools utilized by health educators in their course to tackle challenges of health problems. Vincent *et al.* (2014), defined theoretical framework as any factual or suggestive theory of sociology and /or psychology series of actions that can be applied to the understanding of phenomena.

Superficially, theories are utilized to give knowledge and forecast how and why individuals alter their unwanted behaviors to wanted behaviors. Behavior changes theories are based on the fact that all behavior is learned, it can also be unlearned and adaptive behavior substituted. Behavioral theories applicable to health education are numerous, a few of those related to this study will be reviewed. Behavioural theories applicable to health education are numerous, a few of those related to this study were reviewed as shown in figure 1. They are then conceptualized in figure 2.

Among these theories is the Health Belief model (HBM) and theory of reasoned action (TRA).The Health belief model center of focus is on the connection between health etiquette, practices and how individuals make use of health services while the theory of reasoned action looks at how an individual's behavior is regulated by his outlook towards the product of that behavior. These theories are the theories of anchor for this study.

2.5.1 Health Belief Model (HBM)

The Model of health belief is extensively used in health care. As a cognitive model since the 1950s, it has been used to analyse factors which contribute to ones behaviour and also gives us insight of consequences of behaviours which are considered as high risk to the health of an individual (Khani *et al.*, 2017). This theory has been used comprehensively in various topics such as; smoking, substance abuse, sexually transmitted infections and obesity among others. Thus health belief model being a theory that is widely used in preventive medicine, can be used in preventive measures of diseases such as hypertension. This theory marked the beginning of systematic theory-based research in health behaviours. It focused on the connection between health etiquettes', practices and use of health services. Its assumptions are

that an individual's health related behaviours is determined by on his beliefs of vital variables: recognised threat which consist of known susceptibility and recognized severity of a health condition, discerned benefits, recognised barriers, promoting's to action, and self-efficacy (Rosenstock, 1994).

Perceived susceptibility mentions about one's feelings of the danger of contracting a health condition (Hypertension). An individual's conscious potential to effectively undertake a health plan ,for example avoidance of stress will greatly influence his or her commitment and capability to perform or undergo a changed behaviours. Perceived severity is a person's feeling concerning the seriousness of contracting an illness. The more vulnerable a person feels, the more motivated the person would be to take action or reduce the threat (Akintaro, 2015).

Perceived benefits refer to belief regarding effectiveness of available health actions to reduce the perceived threat from the illness.will people make efforts enough to serve fruits and vegetables on a daily bases if they didn't think it was profitable? Would people stop smoking if they did not think it would be for the betterment of their health? Can people make use low salt diet if they didn't think it had positive effect to their bodies? Almost certainly they would not. Recognized benefits has a vital role in the promotion of secondary prevention etiquettes, such as health screenings. A fine example of such a measure is screening for hypertension. A recognizable measure of screening tests for hypertension is a taking of blood pressure (Alberto, 2013).

Perceived barriers refer to those negative factors that may impede the person's action to acquiring the desire health behaviours. For the purpose of adoption a new behaviour a person needs to conclude that the advantages of the new behaviour are more than the consequences of continuing the old behaviour.This enables overpowering of obstacles/barriers and the acquired etiquette to be embraced. Barriers to control of hypertension include factors such as long waiting time at a health facility, lack of drug for management of hypertension, lack of knowledge of lifestyle modification strategies, poor practice of lifestyle modification strategies. These factors can make patients not to engage in healthy behaviours. Factors like exercise, reduction in salt intake and reduction in alcohol intake may help people to

promote health (Akintaro, 2015). Self-efficacy is an individual belief in his /her capacity to successfully execute the specific performance required to produce the desired results. This model has been utilized favourably by many across all health behaviours. Patients who believe that certain lifestyles such as excess salt intake and inactivity may affect their blood pressure control will achieve good health by avoiding such lifestyles (Adeloye & Basquill, 2014).

2.5.2 Theory of Reasoned Action

This particular theory was proposed by Keke Ajzen and Martin Fishbein in 1975 to show how attitude impact on behaviour. It states that an individual's behaviour is influenced by his feelings towards the products of that behaviours, and by the viewpoint of the important others in his social environment. In conforming to this theory, a person's purpose to undertake a certain etiquette is a product of two factors: namely the thinking or feeling (positive or negative) towards the behaviours, and the impact of the communal environment (general subjective norms) on the behaviours. The thought or feeling towards the behaviours is decided by individuals trust that a given result will be produced if he or she undertakes the behaviour.

The communal or subjective standard is decided by a person's standardized belief about what vital or important others think how one should act or behave and by a person's stimulus to follow the wishes of those other people. An attitude is a product of belief. If a person has confidence that carrying out a specific etiquette will lead to favourable results, then he or she have a positive attitude towards undertaking that particular behaviour. On the contrary , an individual who has belief that undertaking that particular behaviours will result to mainly bad outcomes will keep a negative attitude.

It also expresses that an individual behaviours is purposed by his goal of undertaking the behaviour and his subjective norm. This provides a frame for the study of behaviours. Attitudes and intension can also be influenced by knowledge. This theory is related to knowledge because if adults have the knowledge of risk factors, it will help them to avoid negative unhealthy lifestyles towards hypertension. Otieno *et al.*,

(2016) posited that TRA stresses that one's attitude towards a particular behaviour are influenced by belief outcome of the behaviours (Otieno *et al.*, 2016).

This theory is utilized to analyse the health seeking behaviour, knowledge and practice of lifestyle modification towards hypertension and its prevention among of Imenti North Sub County. Patients who lack knowledge will develop negative attitude towards unhealthy lifestyles such as inactivity, excessive salt intake, and excessive alcohol consumption which may predispose them to likely hypertension. On the other hand, those who have adequate knowledge of hypertension will have positive attitude towards unhealthy lifestyles.

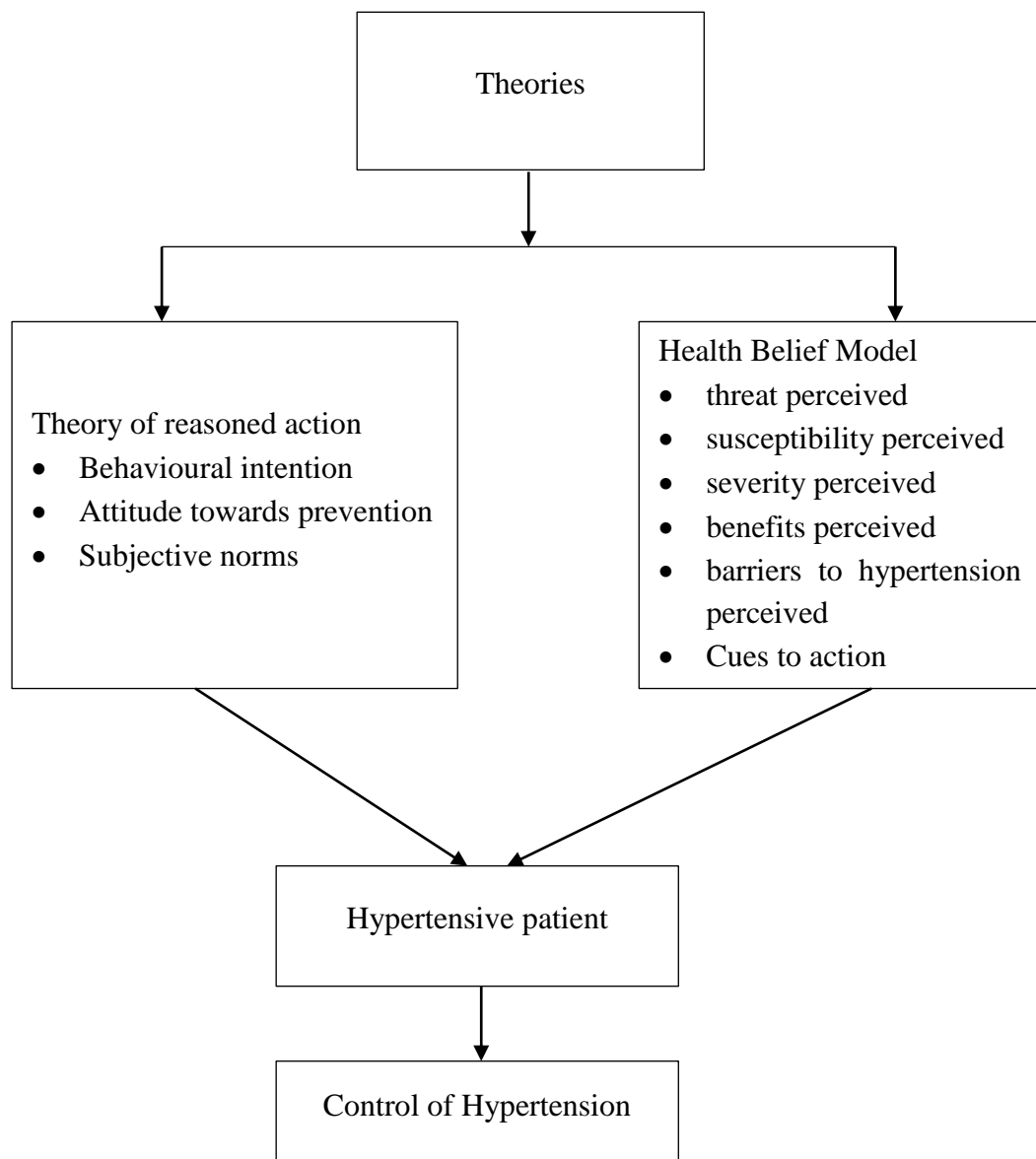


Figure 1: Schematic representation of Theoretical Framework (Morowa *et al.*, 2012)

These theories illustrate that adults health related behaviour depends on his perception of critical variables: perceived threat which consist of perceived susceptibility and perceived severity of a health condition, perceived benefits, perceived barriers, cues to action, and self-efficacy and significant others in the environment. Individual characteristics such as knowledge can influence behaviour. Knowledge of hypertension will help in the perception of threat, susceptibility, severity, benefit, barriers and cues to action. This will promote changes in behaviour for control of hypertension thus reducing mortality and morbidity.

2.6 Conceptual Framework

Independent Variables

Dependent Variable

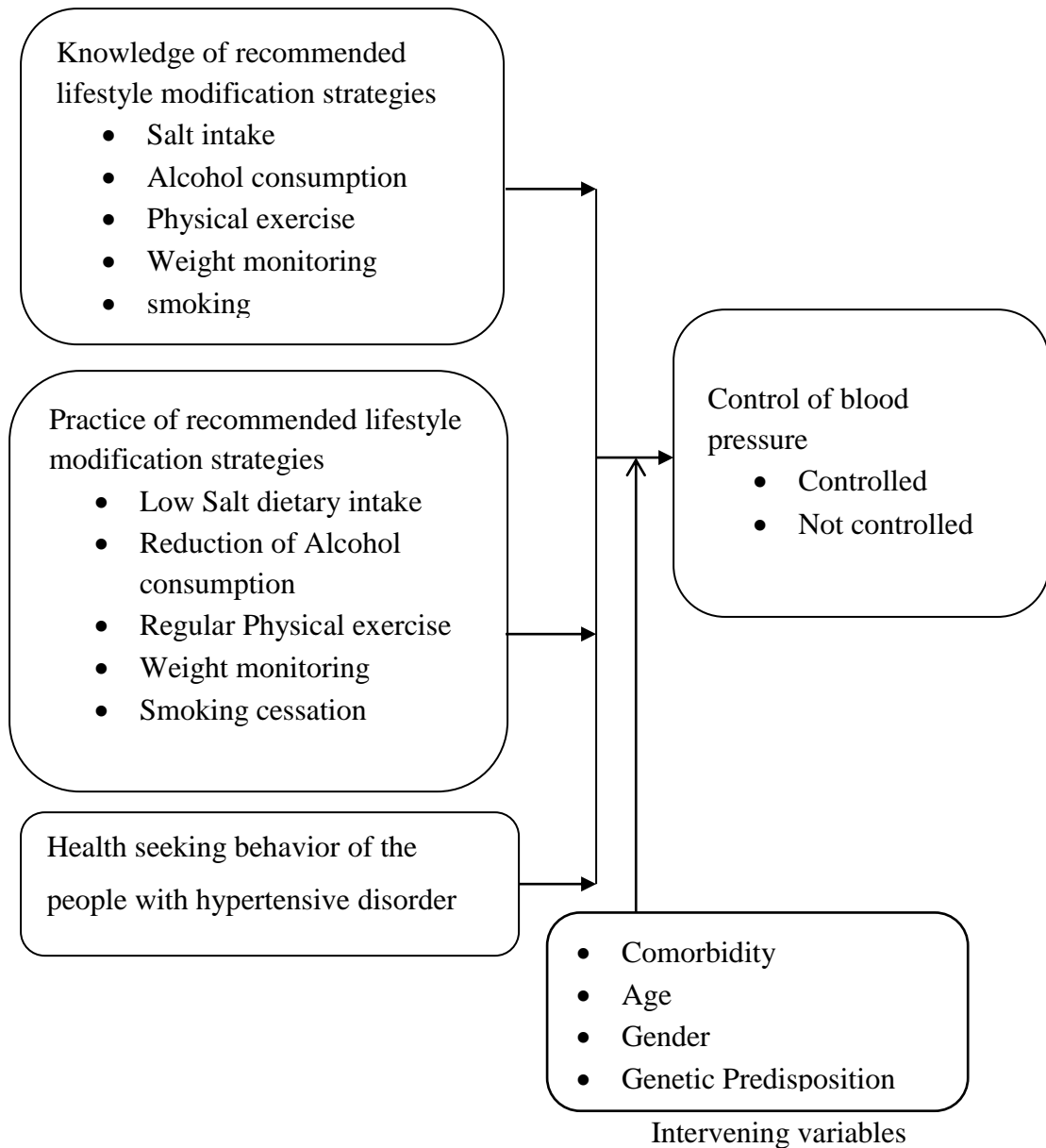


Figure 2: Schematic representation of Conceptual Framework

According to (Fawett & Desanto, 2013), conceptual framework are efficacious in guiding research of complex problems .It also helps to define concepts which are considered relevant to the event of interest and helps to illustrate the relationship between the various concepts under study. The patients were assessed on knowledge and practice of five recommended strategies which included; low dietary salt intake, low or reduced alcohol consumption, regular physical exercise, weight monitoring and cessation of smoking. The health seeking behavior of the respondents was also analyzed.

CHAPTER THREE

METHODOLOGY

3.1 Area of the Study

The study was conducted in Imenti North Sub County in Meru County, among hypertensive patients attending outpatient services in selected health facilities. These facilities included; Runogone dispensary, Nthugu dispensary, Gakoromone dispensary, Giaki Sub District Hospital and Meru Teaching and referral hospital. Imenti north Sub County is one of the nine sub counties of Meru County. The headquarters of Meru County, which is at Meru town, is located within Imenti North Sub County. Imenti North is mostly an agricultural and business centre. It has five administrative wards namely Ntima east, Ntima west, Municipality, Nyaki east and Nyaki west. The sub county has 34 main health facilities and has an estimated population of 258,947 (Kenya National Bureau of Statistics, 2013).

3.2 Research Design

For the purpose of achieving the objectives of this study, cross sectional design was adopted. This specific design was found to be ideal for use in this study because it gave vital information on health seeking behavior and lifestyle modification of hypertensive patients in Imenti North Sub County, in managing their hypertensive condition. This design was relevant because also a few people considered to be representative of the population were studied.

3.3 Population of the Study

The study population comprised of hypertensive patients of ages of 18 and seeking hypertension services in health facilities of Imenti North Sub County. According to health information system (HIS) in Meru County the estimated population of the hypertensive patients is 3616. There may be other hypertensive patients who do not seek their services in the county health facilities therefore may have not been included in this figure.

3.4 Sampling

3.4.1 Sample Size Determination

Nassiuma (2000) asserts that a coefficient of variation of at most 30% and a standard error of $2\% \leq e \leq 5\%$ is acceptable in most surveys. In this study a coefficient of variation of 30% was used and a standard error of 0.02.

Nassiuma (2000) gives the formula as follows;

$$\text{Sample size } n = \frac{NC^2}{C^2 + (N-1)e^2}$$

Where, n = sample size

N = population from which sample is obtained, 3616

C = coefficient of variance, 30%

e = standard error, 0.02

Therefore the sample size is:-

$$n = \frac{3616(0.3)^2}{0.3^2 + (3616-1)0.02^2}$$

n=212

3.4.2 Sampling Procedure

Cluster sampling and purposive sampling method were used. Cluster random sampling was utilized to choosing the health facilities that were included in this study. Firstly, clusters were formed by dividing health facilities as per the five administrative wards in the sub county; this gave a total of five clusters. Simple random sampling of one health facility in each cluster was carried out. This gave a total of five health facilities.

For each selected health facility purposive sampling of the participants in the outpatient who met the inclusion criteria was carried out in order to make a representative size of 212 in total. The sum of participants for each selected facility was allocated proportionately depending on average monthly number of hypertensive patients, as shown in the Table 1.

Table 1: Proportionate sampling of participants

Name of facility	Administrative ward	Number of participants per facility	Percentage of the participants
Runogone Dispensary	Nyaki west	37	17
Nthungu Dispensary	Ntima West	22	10
Giaki Sub District hospital	Nyaki East	31	15
Gakoromone Dispensary	Ntima East	22	10
Meru teaching and Referral	Municipality	100	47
Total		212	100

3.5 Inclusion and Exclusion Criteria

Inclusion criteria- Patients who were re- attendances with hypertension and obliged to be involved in the study.

Exclusion Criteria – New cases of hypertensive patients and those re-attendances unwilling to be involved in the study.

3.6 Data Collection Instruments

The data collection tool that was a structured questionnaire attached in appendix I. The items in the questionnaire were organized to reflect the purpose of the study as well as research questions. The questionnaire was divided into four parts namely A, B, C, and D. Section A comprised of demographic data (Age, gender, marital status and level of education). Section B comprised of ten questions on knowledge of hypertension. Section C comprised of five questions practice of lifestyle modification strategies and Section D comprised of seven questions on health seeking behaviour of hypertensive patients. The respondents were requested to give the information regarding five recommended strategies for blood pressure control. These were; knowledge on recommended dietary salt intake, the frequency of physical exercise, weight monitoring, alcohol intake and smoking effects on blood pressure. In relation to practices of the recommended strategies, the respondents were expected to give honest information on their daily practice of the recommended strategies. After responding to the questions, an average of the respondents' blood pressure was determined using the last three blood pressure findings for the current and previous clinic. Using the WHO guidelines, the researcher established those respondents with normal ranges of blood pressure and those whose blood pressure was above the normal ranges.

3.7 Pretesting

A pretest was done in Githongo Sub County hospital to pretest the questionnaire. According to Mugenda, a sample for pretest study should be (1-10%) of final sample size (Mugenda & Mugenda, 2003). A random sample of 20 research participants with the desired characteristics was selected and the questionnaire administered to them. In this, the questionnaire was standardized to ensure that the questions provided the desired answers. For easy reading and comprehending the content of the questionnaire, Flesch reading easy score was used. The test indicated 82% readability score. Comments made by the respondents were used to improve the instrument in making it clear and understandable to the respondents.

3.7.1 Validity

The questionnaire was checked by experts from Chuka University for face and content validity. Their main task was to critically examine the questionnaire and determine whether the content was in accordance with the study objectives. During pretesting, content and construct validity was ensured. The questions that were giving distorted information were reconstructed and tested for validity according to the objectives of the research.

3.7.2 Reliability

In order to ascertain that the research instrument was dependable, the instrument was pre tested in Githongo Sub county Hospital which was not part of the actual study. Ten participants were selected for the pretest study which represented point zero five of the sample size. According to Mugenda and Mugenda (2003) cited that a desired pretest used is one to ten percent of the true sample size. Split half method was used to pretest the questionnaire.

3.8 Data Collection Procedure

Collection of data was carried out by the researcher for a period of four weeks. Prior to commencement of data collection, the researcher obtained all the necessary documents. The researcher administered the questionnaire to the adult patients after explanation and seeking their consent. Data was collected through interviewing face to face, using well formulated questionnaire which was redesigned from the past

similar studies. The researcher then reviewed each questionnaire for completeness. This research proposal was submitted to the Ethics and Research Committee of the University of Chuka for review and permit for carrying out the study obtained from National Council of Science and technology (NACOSTI) attached in appendix II

3.9 Data Analysis

After the data was collected it was coded and analysed using Statistical Package for Social Science (SPSS) for windows version 24.0. Statistical methods for description like frequencies, proportions and measures of dispersions were utilized to give a detailed account of the socio-demographic, knowledge, lifestyle and health seeking variables. The relationship linking the study variables was tested by use of a chi-square.

3.10 Ethical Considerations

The main ethical issues to be addressed in this research proposal include privacy during data collection for the purposes of confidentiality of the subjects information that will not be divulged to any other person unless as authorized by the subject when necessary. An informed written consent was obtained from subjects following a detailed explanation on the nature and reasons for the research. Names of subjects were kept anonymous by writing numbers on the questionnaire instead of their names. Site approval was obtained from Imenti North Health administration before starting data collection. To avoid plagiarism all materials in this study were referenced appropriately.

CHAPTER FOUR

RESULTS

4.1 Response Rate

The study targeted a sample size of 212 nurses working in maternity departments from which 200 filled in and returned the questionnaires making a response rate of 88.7%. This response rate was satisfactory to make conclusions for the study as it acted as a representative. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was excellent.

4.2 Reliability Analysis

The study used the Cronbach's alpha test, since it is the widely used reliability index that estimates the internal consistency of a composite measure composed of several subparts also called the coefficient alpha (Polit & Beck, 2012). The alpha value above point seven is considered good for a research while that below point seven weaken the ability to rely on the instrument. A large sample was taken to minimize levels of biasness. Reliability was calculated with the help of statistical package for Social Sciences (SPSS) and an Alpha Cronbach's established at 0.823. A correlation coefficient greater or equal to point seven is acceptable (George & Mallery, 2003).

Table 2: Reliability Analysis

Scale	Cronbach's Alpha	Number of Items
Lifestyle modification strategies practiced among hypertensive patients	0.815	10
Health seeking behavior among hypertensive patients	0.823	7

4.3 Demographic Characteristics of the Participants

The study involved patients who already diagnosed to be hypertensive. The study established that (60 %) of the respondents were female. The mean age of the respondents was calculated to be 52.64±2.6 years, with majority of them being above 40 years. A considerable number of respondents, 84 (42%) were secondary education holders, followed by primary education 45 (22.5%) and 44 (22%) had a no formal education; the remaining respondents had tertiary level of education. Majority of

patients 133 (66.5%) were married, with 22 (11%) single, 33 (16.5 % separated and 12 (6%) who had been divorced. The Table 3 shows a summary of the characteristics of the respondents.

Table 3: Demographic characteristics of the respondents

Variable	Category	Frequency	Percentage
Age in years	18-28	10	5
	29-39	38	19
	40-49	92	46
	Above 50	60	30
Gender	Male	80	40
	Female	120	60
Level of education	No formal education	44	22
	Primary	45	22.5
	Secondary	84	42
	Tertiary	27	13.5
Marital status	Single	22	11
	Married	133	66.5
	Separated	33	16.5
	Divorced	12	6

4.4 Lifestyle Modification knowledge levels and Practice

Majority of the respondents were aware of the two strategies employed to manage hypertension; use of drugs and lifestyle modification. The researcher was interested on mostly lifestyle modification strategies. These strategies included; alcohol intake reduction, regular physical exercise, maintenance of body weight, cigarette smoking and low salt diet intake.

4.4.1 Knowledge on Alcohol intake Reduction

Majority of the respondents 156 (78 %) had received lifestyle modification counseling from a health worker. More than half of the patients, 146 (73 %) reported that alcohol can affect blood pressure. Out of the 146 patients, 24 of them had their blood pressure controlled for the previous three months. Majority of the participants, 124 (62 %) had been taught by health care provider about effects of alcohol on blood pressure.

In this study, majority of the patients had knowledge on how alcohol consumption affects blood pressure control. However, there was a small correlation between knowledge on alcohol consumption and blood pressure control at spearman Rho

correlation of 0.066. On determining the significance of knowledge of alcohol consumption on actual control of blood pressure, the association was not significant ($\chi^2=0.877$, N=200, p=0.349).

Table 4: Alcohol intake

Variable	Category	Frequency of controlled blood pressure (N=200)		df, OR	P value
		Yes	No		
Knowledgeable on effects of Excess consumption of alcohol on blood pressure control	Yes (146)	24	122	Df=1, OR=1.479	P=0.349
	No (54)	6	48		

4.4.2 Actual Reduced alcohol consumption

On alcohol consumption, 101 (50.5%) of the respondents were taking alcohol. On average, the other half 99 (49.5%) were not taking alcohol. Those who were not taking alcohol were a mixture of those who ceased to consume alcohol and those who have never taken alcohol at all in their lives. Out of all those who consume alcohol only 3 had their blood pressure controlled within the previous three months, while 27 out of 99 of those who do not take alcohol had their blood pressure controlled. Majority of those who do not consume alcohol and had uncontrolled blood pressure, had other contributing factors.

On further analysis, there was a small association between alcohol consumption and blood pressure control with a Cramer's V value of 0.340. Those who consume alcohol were 1.334 more likely to have uncontrolled blood pressure compared to those who do not take alcohol while those who do not consume alcohol had a lower odds ratio of 0.109. On computation of Chi-square, alcohol consumption was significantly associated with control of blood pressure ($\chi^2=23.159$, N=200, p=0.000).

Table 5: Effects of excess alcohol consumption on blood pressure

Variable	Category	Frequency of controlled blood pressure (N=200)		df, OR	P value
		Yes	No		
Currently consumes alcohol	Yes (101)	3	98	df=1, OR=0.109	P=0.000
	No (99)	27	72		

In this study, the participants are aware of effects of excess consumption of alcohol, more than half of the patients were able to tell the effects. In Imenti, the patients attend health clinics, especially hypertensive clinics and are counseled on the effects of alcohol consumption on management of hypertension.

4.4.3 Knowledge on Salt intake reduction

On salt intake, a greater number of the respondents, 180 (90%) suggested that too much salt in food can increase blood pressure. Less than half (28)of those patients who were knowledgeable on effects of excess salt in diet in relation to blood pressure control had their blood pressure controlled. A small number of respondents had poor knowledge on salt intake in relation to hypertension management and had their blood pressure uncontrolled. Therefore, knowledge on effects excess salt intake on blood pressure control was not determining the control of blood pressure. This was confirmed on computation of Chi square which gave non-significant results ($\chi^2=0.436$, N=200, p=0.509). It was evident that this was after health care provider had counseled them on the same since 146 (73%) reported to have been taught.

Table 6: Low salt diet intake

Variable	Category	Frequency of blood pressure controlled (N=200)		Df, OR	P value
		Yes	No		
Knowledgeable on effects of Excess dietary salt intake on blood pressure control	Yes (170)	28	152	Df=1, OR=1.556	P=0.509
	No (20)	2	18		

4.4.4 Practice recommended low salt diet intake

Most of the patients 126 (63%) were taking low salt diet as advised by the health care provider. Out of these, only 28 of the patients had their blood pressure controlled. However, among the 74 (37%) patients who were talking food with salt, 2 had their blood pressure controlled. They said food tasted sweet with salt ($\chi^2=4.259$, N=200, p=0.039).

Table 7: Practice of low salt dietary intake

Variable	Category	Frequency controlled pressure (N=200)		of blood	df, OR	P value
		Yes	No			
Takes the recommended salt diet	Yes (126) No (74)	28 2	98 72		df=1, OR=1.251	P=0.000

4.4.5 Knowledge on Smoking Cessation

More than half of the participants, 67% were aware that smoking can affect blood pressure, the remaining were not aware. Less than half (25) of the patients who were knowledgeable, had their blood pressure controlled while 109 patients had uncontrolled blood pressure. This can be attributed to other factors that affect blood pressure control. An average number of the respondents, 51% had been educated on danger of smoking in management of hypertension.

On inferential analysis, knowledge on smoking was minimally associated with actual blood pressure of the patient at Phi Cramer's V value of 0.146 and a likelihood ratio of 4.707. However, those patients who had knowledge on smoking were 2.463 more likely to have their blood pressure controlled compared to those who lacked the knowledge. Therefore, knowledge on smoking significantly influenced blood pressure control of the patient ($\chi^2=4.259$, N=200, p=0.039).

Table 8: Smoking effects on blood pressure

Variable	Category	Frequency of controlled blood pressure (N=200)		Df, OR	P value
		Yes	No		
Knowledgeable on effects of Smoking on blood pressure control	Yes (134) No (66)	25 5	109 61	Df=1, OR=2.463	P=0.03 9

4.4.6 Actual Smoking status

It was evident from the results that majority of the respondents 181 (90.5%) were not smoking. However, only 30 of them had their blood pressure controlled. Those who were not smoking included those who had stopped smoking and those who have never smoked in their lives. A small percentage of the study participants (9.5%) were

involved in smoking. Among these who smoke, none of them had their blood pressure controlled, therefore, smoking greatly affects blood pressure control.

On further analysis, those patients who smoke, were 1.199 more likely to have uncontrolled blood pressure compared to those who do not smoke. There was a positive correlation of 0.176 between smoking and uncontrolled blood pressure. When chi square was computed on smoking and control of blood pressure, the results were significant ($\chi^2=3.705$, N=200, p=0.049).

Table 9: Effects of smoking on blood pressure management

Variable	Category	Frequency of controlled blood pressure (N=200)		Df, OR	P value
		Yes	No		
Smoke currently	Yes (19)	0	19	Df=1, OR=1.199	P=0.049
	No (181)	31	150		

4.4.7 Knowledge on Body Weight Reduction and Monitoring

On average, 50% of the respondents knew their body weight and BMI in relation to hypertension management. Out of the half of the respondents who were knowledgeable, only 19 had their blood pressure controlled. It was worth noting that out of those didn't monitor their weight, 11 had their blood pressure controlled. Excess weight gain as a danger to management of hypertension was elicited by 133 (66.5%) respondents taught by health care providers. Less than half of the respondents, 67 (33.5%) were not aware of the dangers.

Further analysis revealed that knowledge on weight monitoring was not a significant predictor in blood pressure control. However, there was a positive correlation between blood pressure control and body weight monitoring (Rho=0.112). Those patients who had knowledge on monitoring their body weight as recommended were 1.462 more likely to have their blood pressure controlled than those who didn't. Knowledge on weight monitoring was not a significant predictor of blood pressure control ($\chi^2=2.51$, N=200, p=0.247).

Table 10: Weight gain monitoring and management

Variable	Category	Frequency controlled of blood pressure (N=200)		df, OR	P value
		Yes	No		
Knowledgeable on effects of excess body weight gain on blood pressure control	Yes (100)	19	81	df=1, OR=1.462	P=0.247
	No (100)	13	87		

4.4.8 Actual Weight Management Practice

It was impressive to find out that 181 (90.5%) of the respondents were able to maintain their body weight. Body Mass Index is a crucial indicator for obesity and risk factor prediction for hypertension. In this study, 32 patients who monitored their body weight had controlled blood pressure. In this study only 19 (9.5%) of the respondents who were unable to monitor and maintain their weights within the recommended range. It is worth noting that none of the patients who didn't monitor their weight had controlled blood pressure.

Weight monitoring was found to be a predictor in blood pressure control. This was after analysis of weight monitoring association with blood pressure control which was positive at Phi Cramers V value of 0.141 and a likelihood ratio of 6.995. The patients who monitored their weight were 1.215 more likely to control their blood pressure compared to those who did not monitor their weight ($\chi^2=3.999$, N=200, p=0.046).

Table 11: Actual body weight monitoring and management

Variable	Category	Frequency controlled of blood pressure (N=200)		Df, OR	P value
		Yes	No		
Maintains the recommended body weight (BMI)	Yes (181)	32	149	Df=1, OR=1.215	P=0.046
	No (19)	0	19		

It was evident from the study that the participants were knowledgeable on monitoring and maintaining their body weight within the recommended ranges of body mass index (BMI). However it was reported that, other than trying to maintain the weight

through exercise, some of the participants were genetically obese. This posed a challenge to such patients since they did everything as recommended.

4.4.9 Knowledge on Regular Exercise

On probing for knowledge on exercises, more than half of the respondents 141 (70.5%) knew that exercises can prevent high blood pressure. Most of these patients had been counseled on management of hypertension. Less than half (20) patient who were knowledgeable had their blood pressure controlled, this shows that there are other determinants of blood pressure control other than knowledge on exercises in relation to blood pressure control. This was evident since 10 of the patients who were not knowledgeable about importance of exercises had their blood pressure controlled.

Table 12: Effects of regular exercise on blood pressure

Variable	Category	Frequency of controlled blood pressure (N=200)		Df, OR	P value
		Yes	No		
Knowledgeable effects of regular physical exercise on blood pressure control	Yes (141)	20	121	Df=1, OR=0.837	P=0.618
	No (59)	10	49		

4.4.10 Actual Regular Physical Exercise

Majority of the respondents, 134 (67%) reported to do physical exercises for 30 minutes daily. This is recommended for patients suffering from hypertension. However there were those who do physical exercise for few minutes less than 30 and were classified as not doing exercise as recommended. Those who were not doing regular physical exercise or did it for less than the recommended time duration accounted for 66 (33%). Out of the 134 patients who do regular exercises, only 25 of them had their blood pressure controlled. Due to other factors, 5 of the patients who didn't adhere to the recommended duration and frequency of the exercises had their blood pressure controlled.

The patients who followed the recommended schedule for regular exercises were 1.136 more likely to have their blood pressure controlled compared to those who did

not exercise regularly. Regular exercises and blood pressure control were correlated at (Rho=0.146) with a likelihood ratio of 4.707. On computation of Chi square, regular physical exercise was a significant predictor of blood pressure control ($\chi^2=4.259$, N=200, p=0.039).

Table 13: Actual effects of physical exercise on blood pressure

Variable	Category	Frequency of blood pressure controlled		Df, OR	P value
		Yes	No		
Practice regular physical exercise as recommended	Yes (134)	25	109	Df=1, OR=1.136	P=0.039
	No (66)	5	61		

Majority of the patients were aware of the benefits of physical exercise but were not compliant with the prescribed frequency and duration. Most of the patients reported that they did the exercises but for less than 30 minutes as recommended by the health care provider. This affected their blood pressure control significantly..

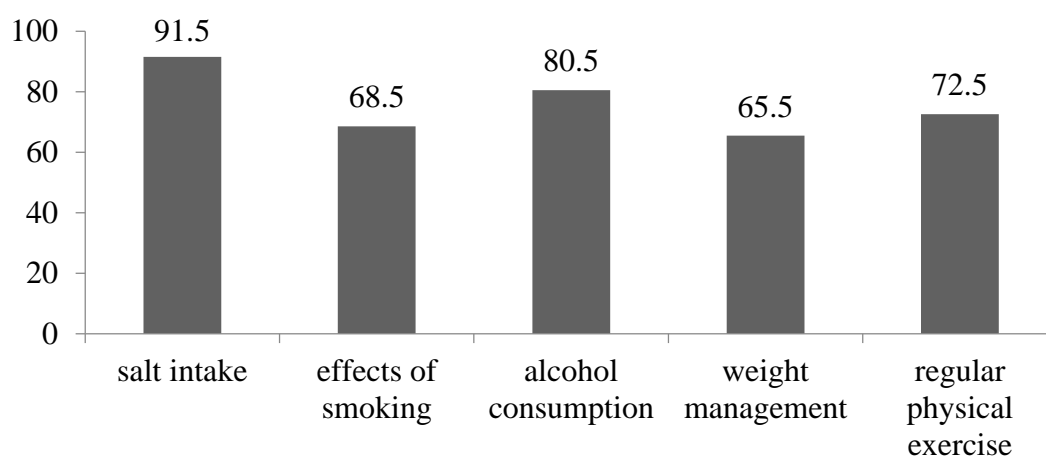


Figure 3: Lifestyle modification knowledge levels

In general, it was evident that the level of knowledge on management of hypertension was above average and health care providers were cited as the source of the information. The respondents reported that they have support groups in which they attend hypertensive clinics, during these clinics they are taught on various modalities of managing hypertension

4.5 Practice of lifestyle modification strategies among hypertensive patients in Imenti North

The patients were rated on five items on how they practice lifestyle modification strategies. A patient who adhered to the five recommended practices was considered practicing good lifestyle modification practices. Each of the recommended practices was awarded 1 mark and those who didn't practice the recommended strategies attracted a zero mark.

4.5.1 General practice of lifestyle modification strategies

In general, only 26 (13%) practiced all the recommended lifestyle modification strategies in management of hypertension. Majority of the respondents 174 (87%) practiced a few or none of the recommended lifestyle modification strategies. If a patient missed to practice one or more of the ideal, was considered to have defaulted the practiced. Those who practiced scored 1 point while those who didn't scored zero. Therefore, a score of five meant good practice and a score of less than five poor practice. In general the patients who adhered to all the recommended lifestyle modification strategies (good practice) had their blood pressure controlled ($\chi^2=113.59$, $N=200$, $p=0.000$).

Table 14: Practice of lifestyle modification strategies

Variable	Category	Frequency	Percentage
Recommended low salt diet intake	Yes	126	63
	No	74	37
Consumes alcohol	yes	101	50.5
	No	99	49.5
Regular physical exercise	Yes	134	67
	No	66	33
Maintains body weight	Yes	181	90.5
	No	19	9.5
Smoking cigarette	Yes	19	9.5
	No	181	90.5
General practice of lifestyle modification	Good practice	26	13
	Poor practice	174	87

4.6 Health seeking behavior among hypertensive patients in Imenti North

Majority of the patients 97 (48.5%) had been diagnosed to be hypertensive during routine medical checkups, 62 (31%) had been diagnosed during medical screening

program, 39 (19.5%) were diagnosed during emergency services and 2(1%) were diagnosed after being admitted with some other illness or during pregnancy.

Table 15: Point of diagnosis for hypertensive patients

Point of diagnosis	Frequency	Percentage
Routine medical check up	97	48.5
Medical screening program	62	31
During emergency services	39	19.5
When admitted with a different condition	2	1

This shows routine medical checkups and medical screening program can be utilized to diagnose as much as possible people with undiagnosed hypertension. Patients and relatives should be screened for hypertension since the condition does not present with pain.

4.6.1 Availability of medicine and personnel

Almost all of the respondents, 192 (96%) were on medication to regularize their blood pressure. Out of all these only 135 (67.5%) were taking the medication as prescribed. The remaining proportion gave their reasons as follows; 21 (10.5%) took the medication only when the blood pressure was high and never took them when having normal blood pressure, 12 (6%) were unable to afford the medicine after completing the dosage given from hospital, 4(2%) reported that the prescribed drugs were not available, 7 (3.5%) didn't like the medication taste, 6 (3%) didn't take the medication due to related side effects, and 14 (7%) forgot to take the medicine.

Those patients who didn't get their medication in the hospital, 185 (92.5%) reported to have bought their medicine from chemists/ pharmacies while 15 (7.5%) got helped by family/ friends who are hypertensive and using the same medicine. Interestingly, none of the respondents reported to have sort use of herbal medicine as an alternative for the prescribed medicines, instead they sort alternative point of sale of the same drugs and most of them got them from their preferred chemists or pharmacies.

Majority of the respondents bought their prescribed medicine from their preferred chemists; this was associated with their perceived effectiveness from those chemists. Some members reported that whenever they got medication from the government

health facility, these drugs never helped them. The same was contradicted by others who were buying the drugs from government health facility because they were relatively cheap.

Table 16: Reasons for not taking antihypertensive drugs as prescribed

Reason	Frequency	Percentage
Didn't like the medication taste	7	3.5
Related side effects	6	3
Take it only when blood pressure is high	21	10.5
Cost (unable to afford)	12	6
Availability of drugs in the chemists	4	2
Forgot to take medication	14	7
Took medication as prescribed	135	67.5

4.6.2 Patient waiting time at the facility

Majority of the respondents 131 (65.5%) reported to attend regular blood pressure checkup as advised by the health care provider. Most of those who had irregular blood pressure checkups, 20 (10%) cited long waiting time at the hospital for the checkup, 29 (14.5%) never found it necessary and 10 (5%) reported cost implication in terms of affordability of drugs and distance to health facility to be the deterrent. Other patients reported that whenever they were ok and not feeling sick they never opted to seek health care services.

The social status of the respondents relatively affected their health seeking behavior, the patients whose income was from permanent employment, sought health care services from private hospitals while majority of the farmers sought health care assistance from the government health facilities whose cost was relatively affordable. The respondents reported to have less waiting time when seen in private and long queues in public facility. Majority of the respondents 67% obtained their medication from government health facilities. This was associated with subsidized cost of the medication.

Slightly less than average, 48% of the respondents reported to seek health care assistance from the hospital depending on the severity of the disease. In this, the respondents had been asked to indicate what makes them seek health care services from a health facility. Unlike communicable diseases which present with pain,

hypertension is a silent killer. The respondents reported to seek health care services when they had severe headache and inability to see well. These are true manifestations of high hypertension or hypertensive crisis

CHAPTER FIVE

DISCUSSION

In this section, the results for lifestyle modification strategies are discussed first followed by those of health seeking behavior. In general analysis of demographic data shows that the age bracket of 40 years and above had a higher prevalence of hypertension among the respondents. This is congruent to a study done on relationship between genes and primary hypertension which attributed this to increase in levels of biomarkers of inflammation (Bufford, 2016). Female gender was also noted to have a higher prevalence of hypertension amongst the respondents compared to their male counter parts. This is discordant to one study that showed male gender to have higher prevalence rate compared to females because of female's hormones which play a protective role in hypertension (Everett&Zajacova, 2015). Social class as measured by level of education was noted not to have any significance with the prevalence of hypertension among the respondents. This is similar to a study done in Iran which found no relationship of education and blood pressure (Khajedaluae *et al.*, 2016)

5.1 Knowledge and practice of lifestyle modification strategies

In this study, majority of the patients had knowledge on how alcohol consumption affects blood pressure control. However, there was a small correlation between knowledge on alcohol consumption and blood pressure control at spearman Rho correlation of 0.066. This study revealed that having knowledge on effects of alcohol consumption on management of hypertension does not translate into use. These results are congruent with a study done in South-East Nigeria which also revealed that the patients were knowledgeable but never practiced (Okwuonu *et al.*, 2014).

On analysis, there was a small association between alcohol consumption and blood pressure control. This study revealed that excess alcohol consumption is a predictor of uncontrolled blood pressure. Those patients who reported to be involved in drinking had they there blood pressure uncontrolled. These results concur with the results done by Murad, which also showed that excess consumption of alcohol increased the risk of developing heart complications and increased mortality and morbidity related to hypertension disorder (Murad *et al.*, 2017).

Salt intake, is known to retain water in the body. Increased blood volume, increases blood pressure. Those respondents who had knowledge on these effects of salt in managing their blood pressure had higher chances of taking low salt diet. However, in this study the respondents had knowledge on effects of excess salt intake but still some used the excess salt while others didn't. In this study, it was not clear about the other specific factors that affect blood pressure contributed to uncontrolled nature of the blood pressure of the respondents. The study showed that the participants were aware on effects of excess salt intake on regulation of their blood pressure. These results are in agreement with those in a study done in India which showed a higher percentage of patients with above average knowledge on salt intake in management of hypertension (Patil *et al.*, 2016).

When the respondents were requested to give their actual practice on low salt dietary intake, they reported that sometimes they try to but others reported to use salts regardless of the systemic effects. Those patients, who reported to be adding salt to their meals to make it sweet, had their blood pressure uncontrolled. However, it was not specifically known if the uncontrolled pressure was due to salt intake. High standard evidence in adults who have non acute illness reveals that decrease intake of sodium lowers blood pressure and has no negative effect on the lipid levels, the catecholamine's or kidney function, and moderate standard proof in children reveals that a decrease in intake of sodium lowers blood pressure. Reduced intake of sodium is commonly related with a reduction in the risk of coronary heart disease and also stroke in adults. Overall, evidence indicates that majority of the people will likely have health gain from reduction of sodium intake (Aburto *et al.*, 2013)

Smoking releases nicotine into blood circulation, this substance affects the functioning of the blood vessels leading to increased blood pressure. The respondents had knowledge on these effects but still others smoked during the current study. Those who reported to have smoked had their blood pressure uncontrolled. Most of the patients reported that they had been taught on effects of smoking on the management of their condition; hypertension. However, from the study it was evident that those who followed the counseling were few and their blood pressure was controlled. It was not indicated clearly from the responses given why majority of the

patients never followed the advice given during hypertension clinics. Awareness on effects of smoking on management of hypertension was reported by all patients. These findings echo a study by Mancina in Italy (Mancina *et al.*, 2014). The study revealed that most patients were knowledgeable on effects of smoking in management of hypertension.

The study findings revealed that despite the fact that the respondents had the knowledge on effects of smoking, they still smoked. Some reported that it was hard to quit smoking since it was addictive. In the current study, it was evident that the patients who do not smoke had their blood pressure controlled. The few participants who were reported to be smoking had their blood pressure uncontrolled. Smoking releases nicotine which stimulates the sympathetic system. Once the sympathetic system is stimulated, it releases epinephrine and nor-epinephrine hormones which are associated with increase in blood pressure. This was evidenced in a study on lifestyle modifications in hypertension management (Sakaynah *et al.*, 2018).

Sedentary life and accumulation of cholesterol in circulation impairs the normal functioning of the heart. Increase in weight, predisposes an individual to risk of increased blood pressure. The knowledge on the effects of increase in body weight on management of hypertension is important among the hypertensive patients. The participants reported to monitor their body weight as result of the counseling given during the hypertensive clinics. Majority of the respondents had above average knowledge on effects of weight gain in hypertension management; this was revealed as they explained on how weight gain affects the management of hypertension. The results are congruent with those revealed by Parker *et al.*, (2016).

Weight monitoring was found to be a predictor in blood pressure control. Those patients, who were to have increased their body weight from their previous weight, had their blood pressure higher than the normal ranges. Those patients who had maintained their body weight within normal ranges had their blood pressure controlled. Sedentary life and increase in body weight increases the work load for the heart. The heart muscle strains to pump blood in narrowed blood vessels and these effects of straining heart are revealed as increased blood pressure. It is evident from

the research that increase in weight contributes to increase in blood pressure; these results are congruent with results in a study by Murad et al that also noted increase in weight to have led to increase in blood pressure (Murad, *et.al.*, 2017). Similar findings were also noted in another study whereby increase in weight had positive correlation with development of hypertension, coronary Artery Disease and also some cancers (Ruseski, 2014)

The respondents were aware of doing exercise during the management of hypertension. However, the respondents were not aware on how frequent and for how long they should do physical exercise. Some patients reported to have done the exercise, but not for the recommended duration and frequency. On measuring their blood pressure, majority of those who had regular physical exercise had their blood pressure controlled. In this study majority of the participants were knowledgeable on lifestyle modification strategies used in management of hypertension. This knowledge was from hypertension clinics they attend, they reported to be counseled on these strategies as they attend the clinics. These results are in agreement with study results in Sri Lanka, where the patients were having above average knowledge on hypertension causes, and complications of uncontrolled hypertension (Kisokanth *et al.*, 2016).

There were a group of patients who practiced regular exercise, and had their blood pressure controlled. Most of the respondents reported irregular frequency in doing their exercise; others reported not have done the exercise at all. These results shows that regular exercise done as recommended can markedly lower blood pressure to within normal blood pressure ranges. They are in line with those found by Marfo *et al* in Ghana, which also revealed that exercise is paramount in management of blood pressure (Marfo *et al.*, 2014).

In general, it was evident that the level of knowledge on management of hypertension was above average and health care providers were cited as the source of the information. The respondents reported that they have support groups in which they attend hypertensive clinics, during these clinics they are taught on various modalities of managing hypertension. The level of knowledge was assessed as poor, average and

good. Specific questions were answered under level of knowledge in which a mark was awarded for the correct response. After analysis it was found that the level of knowledge among the respondents was above average.

In this study majority of the participants uses a variety of lifestyle modification strategies, however, they do not practice all of the lifestyle modification strategies. A participant can be taking low salt diet and does exercise but also smokes; this affects the general practice of lifestyle modification strategies. In general, out of the five recommended practices, a patient might have followed at least four of them and failed to adhere to one. This contributed to poor practice of the recommended lifestyle modification strategies. These findings are in line with the findings in a study on lifestyle modification practice and associated factors among diagnosed hypertensive patients in selected hospitals South Ethiopia where participants never practiced all the lifestyle modification strategies (Buda *et al.*, 2017).

5.2 Health seeking behaviour

In this study, most of the patients were taking their medication or sought health care services in case the blood pressure was high. The patients sought health care services in case of severe headache or difficult in seeing well. In the normal parameters, the patient never took the medication. Some reported cost of the drugs as a hindrance especially if the medication they were given from the hospital was over and they needed to buy from the chemists. The social status of the respondents influenced on where they sought their health care services; either from government facility or private hospital. Source of income and type of employment didn't significantly affect the choice to seek health care services. Cost as hindrance to health care seeking was reported in a study on health seeking behavior among elderly hypertensive patients in India, the results in the study had shown the cost of services and medicine as a hindrance (Jain & Sinha, 2015). Availability of medicine and staff attitude were some of the predictors of health seeking behavior in a study in Uganda; in this study availability of medicine was cited as a predictor for health seeking among the participants (Musinguzi *et al.*, 2018).

Majority of patients sought health care services dependent on their current health status. These results were replicated in a study done on health seeking behavior and its determinants among attendees of urban health centre in India; in India it was revealed that the attendees sought health care services dependent on their current health status (Patil *et al.*, 2016). In another study, the elderly were found to seek health care in case of other health problems and not necessarily hypertension, these included conditions like diabetes and chest problems. These results are congruent with the results in this study as the participants reported to seek health care services when sick regardless of the specific condition (Baral & Sapkota, 2018).

The patients who had normal blood pressure reported to have good health seeking behavior. In this study gender was not a determinant of seeking for health care services. These results differ with those of carried out in Nigeria which revealed that among the women with normal blood pressure, 84.6% had good health seeking behaviour whereas among women with elevated blood pressure, only 14.1% had good health seeking behaviour; 21.8% had average health seeking behaviour and 50 patients (64.1%) had poor health seeking behaviour these results are evident that there is an association between health seeking behaviour and blood pressure control as it was assessed and the results showed that women's blood pressure control is significantly associated with the presence of knowledge seeking behaviour, adherence with carbohydrate restriction, fat and salt restriction, stress reduction measures, regular exercise, intake of antihypertensive drugs and regular follow up (Anila, 2013).

For the satisfactory management of rural patients, providers of health care services will need to have understanding and display a kind heart in order to enhance interpersonal relationship and adequate communication with the patients. In addition the health care providers need to display certain qualities such as being sensitive, creative, and integrity and be watchful to patient's preconception of their illness and the required health seeking behavior. Openly questioning health beliefs of a patient can likely result to default and also failure of treatment particularly if patients have chronic illness such as hypertension and have a misconception that is acute and does not require long term treatment. (Iyalomhe & Iyalomhe, 2012)

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The research found out that most of the patients seeking health care services in Imenti North Sub County have an average mean of 51 years and higher proportion were above 40 years of age. Majority of the youths were married, Christians and depend on their parents or guardians for financial support. An average number of participants had a secondary level of education with some having tertiary education and others non-formal education.

The findings showed knowledge on lifestyle modification strategies used in management of hypertension was above average among the patients in this County and this was attributed to various factors including health education given during hypertensive clinics. The patients who sought medical care from the hospital reported to do so when sick or when going for the monthly clinic. The respondents were aware of the five recommended lifestyle modification strategies.

Majority of the patients were aware of the five lifestyle modification strategies; intake of low salt diet, minimizing alcohol consumption, regular physical exercise, weight monitoring and smoking cessation. The participants were able to explain the effects of excess alcohol consumption, intake of excess salt, chain smoking and weight gain in hypertension management. However, majority of the patients had average knowledge on various physical exercises but did not have details of each exercise and recommended duration for the exercise neither the frequency. It was evident from the results that most of the hypertensive patients are grouped together for support, 'support groups' in which they attend monthly hypertensive clinics in which they are educated on hypertension control.

On practice of lifestyle modification strategies, each of the five lifestyle modification strategies was significantly contributing to good control of blood pressure among the participants. When each of the strategy was analyzed on how it influenced blood pressure control, it was evident that the patients who practiced the recommended strategies had their blood pressure controlled. However, when all the strategies were

summed up and assessed against blood pressure control it was found out that most of the patients practiced some of the strategies and did not practice others. Generally, practice of all the recommended strategies was poor among the patients involved in this study.

On health seeking behavior two themes came out after analysis. Availability of the medicines and the cost of the prescribed medicines were a factor contributing to the health seeking behavior of the patients. The respondents reported that, whenever they missed the prescribed drugs in the hospital they were prescribed for drugs to buy, and this practice made them feel that whenever they go for the health care services they are going to pay. Cost implications for both transport and services offered at the clinics affected the frequency of the patients attending the clinics.

The staff's attitude to the patients and time taken to serve the clients was also a predictor to health seeking behavior. It was reported that whenever the patients were served slowly, they queued for long and the long waiting times for the results for investigations demotivated the patients from seeking the health care services. The distance to the health facility was rarely reported as a challenge to health seeking behavior.

5.2 Conclusion

Based on the researchers findings; demographic factors did not affect significantly the practice of the lifestyle modification strategies. The age of the respondent, their marital status and level of education were varying but did not directly affect the practice of the lifestyle modification strategies.

It was evident that the hypertensive patients in Imenti North Sub County are knowledgeable on the lifestyle modification strategies. The patients are enrolled in support groups in which they attend monthly hypertensive clinics. In the clinics, they are advised and counseled on lifestyle modification strategies and use of medicines. This has improved their knowledge on lifestyle modification strategies.

Practice of the lifestyle modification strategies was also assessed, and it was revealed that most patient practice some lifestyle modification strategies and do not practice others. For those patients who managed to practice all the recommended lifestyle modification strategies had their blood pressure controlled within the normal ranges. Majority of the patients knew that they need to do regular physical exercise; but were not sure on how long to exercise per session. Some patients had a challenge that they do physical exercise but not as per the recommended time duration and frequency. On weight monitoring, other than diet and exercise; it was evident that some patients had genes for obese in their families. In such case it was difficult for them to maintain their weight within the normal ranges.

Availability of the drugs prescribed during the hypertension clinics and the cost of both the service and drugs was a predictor of health seeking behavior. Long waiting time and staffs attitude was also reported to be a determinant for seeking health care services. It was evident that most of the clients sought health care services only when they were sick or needed help for their health problems.

5.3 Recommendations

- i. The Government of Kenya to develop policies on implementation of support groups among hypertensive patients in all hospitals, to empower the patients with knowledge on hypertension management and prevention of its complications.
- ii. The Government of Kenya through the Ministry of Health should engage the county government to carry out intensive campaigns on practice of lifestyle modification strategies in management of hypertension to reduce the burden on drug procurement and promote good health of her citizens.
- iii. The health care providers to champion for empowering practice of lifestyle modification strategies through support group linkages and counseling as the country tries to achieve sustainable development goals.
- iv. The health care provider to ensure availability of the drugs used in management of hypertension and reduce the waiting time for the patients. The health care provider to; practice home visiting and counsel patients on; the accessible, affordable and available modifiable strategies.

5.4 Suggestion for Further Research

- i. A qualitative study should be conducted on determinants of lifestyle modification strategies practice among hypertensive patients.
- ii. A qualitative research should be done on perception and attitude of health care workers towards health seeking behavior of the hypertensive patients.

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APPENDIX I: QUESTIONNAIRE

SECTION A: BIO- DATA (SOCIO-DEMOGRAPHIC VARIABLES)

Please tick the option that applies to you.

1. Which of the following age brackets best explains your age?

- 1) 18-28
- 2) 29-39
- 3) 40-50
- 4) 50 and above

2. What is your gender?

- 1) Male
- 2) Female

3. What is your level of education?

- 1) No formal education
- 2) Primary education
- 3) Secondary education
- 4) Tertiary education

4. What is your marital status?

- 1) Single
- 2) Married
- 3) Separated
- 4) Divorced.

SECTION B: KNOWLEDGE ON LIFESTYLE MODIFICATION

1. Have you ever received any lifestyle modification counselling from the Health worker?

- 1) Yes
- 2) No

2. Do you think Alcohol can affect BP?
 - 1) Yes
 - 2) No

3. Did your health provider teach you about too much Alcohol?
 - 1) Yes
 - 2) No

4. Do you think adding salt to food affect BP?
 - 1) Yes
 - 2) No
 - 3) Don't Know
 - 4)

5. Did your HP teach you on dangers of too much salt?
 - 1) Yes
 - 2) No

6. Do you think smoking can affect BP?
 - 1) Yes
 - 2) No

7. Did your HP teach you about dangers of Smoking?
 - 1) Yes
 - 2) No

8. Do you know your Weight?
 - 1) Yes
 - 2) No

9. Did your HP teach you about dangers of excess weight gain?
 - 1) Yes
 - 2) No

10. Can you prevent high blood pressure through physical exercises?
 - 1) Yes[]
 - 2) No[]

SECTION C: QUESTIONS OF PRACTICE OF LIFESTYLE MODIFICATIONS STRATEGIES

1. Do you add salt to your food at the table?
 - 1) Yes
 - 2) No
2. Do you smoke daily?
 1. Yes
 2. No
3. Apart from walking to work, do you engage in physical exercises on a daily basis?
 1. Yes
 2. No
4. Have you tried to control your weight by maintaining or losing?
 1. Yes
 2. No
5. Do you oftenly have a drink containing Alcohol?
 1. Yes
 2. No

SECTION D: QUESTIONS ON HEALTH SEEKING BEHAVIOUR

1. How did you come to know about your hypertension?
 - 1) Screening program
 - 2) Emergency services
 - 3) In a routine medical control
 - 4) Other (specify)
2. Have you been prescribed medication to lower your blood pressure?
 - 1) Yes
 - 2) No
3. Do you take all your prescribed medication and follow other complementary strategies as advised by your HP?
 - 1) Yes
 - 2) No
4. If you don't take your medicine regularly, why don't you take them as required?

- 1) I cannot afford the cost
- 2) Medicine not easily available
- 3) I do not like to take medication
- 4) I only take them when I feel I need them.
- 5) I do not like the side effects of medication
- 6) I forget
- 7) I don't know
- 8) Other

5. Besides the hospital, where else do you get your medication?

- 1) Chemist/nearby market
- 2) Neighbour/family member
- 3) Other(specify)

6. Do you go for routine blood pressure BP check-up as advised by the healthcare provider?

- 1) Yes
- 2) No

7. If you don't go for routine BP check-up, why don't you go?

- 1) I cannot afford the cost
- 2) Long waiting at the health facility
- 3) Poor treatment by the health personnel
- 4) I don't find it necessary.

Other(specify)_____

APPENDIX II
CHUKA UNIVERSITY ETHICS CLEARANCE LETTER



Our Ref: CU/IERC/NCST/18/59 21st September, 2018
THE CHIEF EXECUTIVE OFFICER
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION
P.O. BOX 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH CLEARANCE AND AUTHORIZATION FOR ANN RITA KAJUJU
MWENDA. REG NO SM20/29077/17

The above matter refers:

The Institutional Ethics Review Committee of Chuka University met and reviewed the above MSC Research Proposal titled "Health seeking Behaviour and Lifestyle Modification Strategies on Hypertensive Patients in Imenti North Sub-County". The Supervisors are Dr. Lucy Gitonga and Dr. Paul K. Kamweru

The committee recommended that after candidate amends the issues highlighted in the Attached Research clearance and authorization check list, the permit be issued.

Attached please find copies of the minutes, research clearance and authorization check list for your perusal. Kindly assist the student get the research permit.

Yours faithfully,



Prof. Adiel Magana
CHAIR
INSTITUTIONAL ETHICS REVIEW COMMITTEE
cc: BPGS

APPENDIX III
COUNTY AUTHORIZATION LETTER

COUNTY GOVERNMENT OF MERU
DEPARTMENT OF HEALTH

Telegrams: "HEALTH" Meru
Telephone: Meru 064-32370/1
Fax: 31242
Email: hospitalmeru@gmail.com
When replying should be to:
County Director Medical Services



COUNTY DIRECTOR MEDICAL SERVICES
MERU COUNTY
P.O. BOX 8 – 60200
MERU

Date: 5th March, 2019

Ref: MRU/MED/MRU/C.50

ANNARITA KAJUJU MWENDA
SM20/29077/17
CHUKA UNIVERSITY

RE: APPROVAL FOR YOUR REQUEST TO COLLECT YOUR RESEARCH DATA

Your request to collect data for your Research on "**Health seeking behavior and lifestyle modifications of hypertensive patients in Imenti North Sub County, Kenya**" has been approved.

You will stick to the approved timelines by Chuka University and NACOSTI.

Upon completion of your data collection, you are requested to submit One (1) copy of hardcover bound report and discuss the findings with Director of Medical Services.

Congratulations and wish you the best.


Dr. Lilian Karoki
Director of Medical Services
County Government of Meru



APPENDIX IV
NACOSTI AUTHORIZATION



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No: **NACOSTI/P/19/30777/26454**

Date: **13th February, 2019**

Annarita Kajuju Mwenda
Chuka University,
P. O. Box 109-60400
CHUKA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Health seeking behavior and lifestyle modifications of hypertensive patients in Imenti North Sub County, Kenya”* I am pleased to inform you that you have been authorized to undertake research in **Meru County** for the period ending **13th February, 2020**.

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Meru County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Meru County.

The County Director of Education
Meru County.