DEMAND FOR HYPERTENSION AND DIABETES SCREENING IN KENYA.

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DECLARATION

This research proposal is my original work and has not been submitted for a degree award in any other university.

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This research proposal has been submitted for examination with my approval as university supervisor.

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DEDICATION

This work is dedicated to my entire family: my wife Rachael Obonyo, my son Keith Aviel Obonyo and daughter Cheryl Hera Obonyo. My parents and siblings.

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NCD - Non Communicable Disease

KDHS - Kenya Demographic and Health Survey

CDC - Centre for Disease Control

WHO - World Health Organization

ABSTRACT

Non communicable illness has emerged as a major public health issue and are accountable for about 60% of the global mortality rates. In order to deal with this global burden of NCDS, an improved healthcare system, early detection and timely treatment is required. This research paper has used a secondary cross section data from Kenya Demographic Health Survey (KDHS 2014) data. The data comprise of information on demographic and socio-economic activities of individuals in the entire country. The data was analysed in Stata 14 where the regional pattern of screening and the determinants of demand for screening for each NCD was established. The multivariable probit model showed that residence, region, sex, age, and wealth quintile were significant to screening for hypertension while sex and age were significant to screening for diabetes. The study had a total of 43898 respondents. Out of these, 16,489 did not offer any information on whether they undertake any physical activities and 16,461 did not answer questions on alcohol consumption. Level of screening for either disease was very low. Screening was poorest in North Eastern (n=13, 4.3%) followed by Western (n=30, 10.1%) and Coast (n=30, 10.2%). Majority of the screened people lived in rural parts of the country (n=150, 51%) while those in the urban area were 145(49%)

Policy recommendations are based on statistically significant variables which have been established to be age, wealth index, education level, physical activity, and region. Age, education level and physical activities were found to positively affect hypertension and diabetes screening while sex, wealth index and region was found to negatively affect screening for diabetes. Policy makers should prioritize Non-communicable Diseases prevention if the country is to deal with these epidemics. A budget should also be set aside for countrywide campaigns to increase the awareness and importance of NCDs screenings in the country.

CHAPTER ONE: INTRODUCTION

1.1 Background

Non communicable illness has emerged as a major public health issue and are accountable for about 60% of the global mortality(WHO, 2014). The World Health Organization defines NCDs as health conditions that are non-infectious and cannot be spread from one person to another. The most commonly reported non communicable diseases includes hypertension, diabetes, cancer and chronic respiratory diseases (WHO, 2014). Studies have shown that Hypertension and Diabetes illnesses mostly coexist in human body and one cannot be controlled without giving close attention to the other. They are also the two most common non-communicable diseases and they share similar risk factors hence those who have hypertension can greatly benefit from diabetes screening.

Diabetes is a condition that comes as a result of less production of insulin by pancreas. Insulin is an important hormone and its main objective is to regulate the blood glucose concentration. There are two clinical classes of diabetes, which are, type 1 and 2 diabetes. Type 1 diabetes is mainly characterised by deficiency in insulin production and its symptoms are excessive excretion of urine and fatigue which causes a reduce insulin action in the body. Type 2 diabetes mainly occurs as a result of insufficient use of insulin by the tissues present in the body. Type 2 diabetes is a common type of diabetes and almost 90% of the individuals suffering from diabetes worldwide have it.

Hypertension rarely shows any symptoms. It can go unnoticed for several years, making it more dangerous when compared to diabetes. Its non-specific symptoms may begin to manifest once it has progressed undetected for a number of years. Hypertension and Diabetes are closely linked and neither one can be controlled without giving attention to the other.

1.1.1 Global Perspective

Non-communicable illnesses is a major population health liability in many countries worldwide, and diabetes and hypertension conditions are considered to be the most prevalent chronic diseases in the unindustrialized and industrialized countries (Islam et al., 2014). The global disease profile is rapidly changing and mortalities and disabilities resulting from Non-communicable illnesses are higher than those from communicable and nutritional diseases (WHO, 2010). Non-communicable illnesses have over the years moved from being quite negligible to becoming one of the leading causes of death and morbidity. The WHO (2010) indicated that NCDs contributed to 60% percent of the global deaths and also 54% of disability adjusted life years. These figures are expected to increase by the year 2020 in case no appropriate measures are put into place (WHO, 2010). It is estimated that hypertension affects approximately more than one billion people worldwide and about 40% of adults aged above twenty five years old have been diagnosed with this chronic condition (WHO, 2010). Globally, those people living with diabetes are rapidly increasing due to the different risk factors like urbanization, obesity and also inactive lifestyle. It is therefore estimated that the current diabetic population of 177 million will double up by the year 2030 as a result of demographic changes in most countries (Shaw, Sicree, & Zimmet, 2010). The Middle Eastern countries, India and Sub Saharan countries are most likely to be affected with this increase of the burden of NCDs. In United States of America, a prospective study done reported that those individuals with hypertension were almost 2.5 more likely to have Type 2 diabetes compared to subjects having normal blood pressure. These two diseases co-exists and can be found in the same individual more often (Wei et al., 2011). An interesting fact is that of all these diabetic population, only around one half is known to have these chronic conditions. This is evident from the different epidemiological studies that have been done in the past years.

1.1.2 Diabetes and Hypertension in Africa

Africa host the bulk of the world's population after Asia, but most of the countries have an under-developed public health infrastructures of combating some of these chronic diseases (Mayosi et al., 2012). Africa as a continent is currently experiencing a rapid epidemiological transition and changes in their health status. Communicable illnesses have been the prominent cause of mortality in almost all the African countries. Different demographic, social and economic changes have been witnessed during the last century, and this has led to the emergence of NCDs. The Non-infectious diseases are nowadays not regarded as diseases of the Western world, to those of the developing and the poor countries. The health systems of most African countries are facing different problems in the delivery of health services and dealing with the increasing burden of these NCDs, mostly diabetes and hypertension. The developing countries in Africa are experiencing a twin challenge on handling the problem of both the communicable and non-communicable illnesses(Agyei-Mensah & Aikins, 2010). The occurrence of NCDs in African countries is increasing due to changes in lifestyle as a result of rapid globalization and adoption of some of these western sedentary lifestyles. Globalization does not only relate to economic change of the African countries but it also apply to the human diet and change in lifestyle (Zimmet, 2000). Globalization has been allied to increase in tobacco and alcohol use in the developing countries of Africa as well as nutritional transition to calorie rich diets (Bray & Popkin, 2013). In terms of non-communicable diseases, excessive alcohol and heavy tobacco use has been linked to cardiovascular diseases like hypertension (Parry, Patra, & Rehm, 2011). The non-communicable diseases when not taken care of can pose a severe menace to the health and financial systems of these developing countries (Kankeu, Saksena, Xu, & Evans, 2013). The problem of diabetes and hypertension is continuously rising in both the developed and the developing African countries and these two chronic conditions

are emerging as the prominent cause of morbidity and premature death(Van Minh & Xuan Tran, 2012). This became obvious when approximately 75% of the total world's deaths which resulted from NCDs were witnessed in the developing and Middle-Income Nations, especially in Sub Saharan Countries. In Africa the prevalence of diabetes is estimated at 1-3% in the rural areas and 5-6% in the urban settings (Mbanya, Motala, Sobngwi, Assah, & Enoru, 2010). Although the burden of Diabetes and hypertension is high in Africa, there is limited literature regarding the healthcare for these NCDs in most African countries.

1.1.3 Non-communicable diseases in Kenya

Kenya is one of the unindustrialized countries in Africa going through epidemiological transition from infectious diseases to non-infectious illnesses. The prevalence and burden of diabetes and hypertension has gained unprecedented momentum in Kenya and this has led to the emergence of a public health problems(Joshi et al., 2014). There is limited resources showing the epidemiology of diabetes in Kenya, however the available literatures indicates that the incidence of these chronic condition is on the rise (Christensen et al., 2009). A report by WHO indicated that, 1% of the deaths in Kenya were as a result of diabetes and hypertension in 2012. The WHO indicates that the prevalence of diabetes is at 3.3% with that figure estimated to rise to 4.5% by the year 2025. These figures are based on regional forecasts and there is a high chance that they could be an underestimation since 60% of the people diagnosed with diabetes and hypertension in Kenya usually seek care from healthcare facilities with unrelated complaints. Almost two thirds of people suffering from diabetes and hypertension are not aware that they have these chronic conditions (IDF, 2007). The complications usually occur early in the course of diabetes and these affect majority of patients. This results when there is poor metabolic control and uncontrolled hypertension amongst patients. It is estimated that a mixture of the increasing prevalence of NCDs

and increase in long term complications in Kenya will lead to a drastic increase of the burden of these chronic diseases (Tuei, Maiyoh, & Ha, 2010). The twin challenge from communicable diseases and Non-communicable diseases has posed a great threat towards Kenya achieving their Millennium Development Goals. It is therefore essential to assess this increasing burden by coming up with cost effective strategies which can help in prevention and control of non-communicable disease. The demand for the execution of an appropriate strategy for early diagnosis and management of diabetes and hypertension should therefore be a public health priority.

1.1.4 Risk Factors for Diabetes and Hypertension

In this study a risk factor refers to any exposure of an individual which increases the chances of acquiring non-communicable illnesses. The risk factors associated with having hypertension and diabetes can be categorised into modifiable and non-modifiable risk factors. The effects of modifiable risk factors can be reduced in case you decide to make lifestyle changes while non-modifiable risks usually include age, ethnic background. The older you get the more likely you are to develop some of these chronic diseases. Recent epidemiological studies have clearly proved that certain behavioural factors like cigarette smoking, alcohol consumption, physical inactivity and unhealthy dietary practice are some of the prominent origins of these chronic non-communicable diseases. A study done by (Grundy et al., 2000) in the United States of America indicated that most chronic NCDs have a common preventable risk factors.

Sedentary lifestyle and unhealthy diets are also examples of risk factors for diabetes and hypertension (Hlongwana, Mabaso, Kunene, Govender, & Maharaj, 2009). Sedentary lifestyle is one of the prominent adjustable causes of non-communicable diseases in the world. It is estimated that roughly two million deaths each year are as a result lack of physical activity. According to the CDC report of 2001, Sedentary lifestyle has become a major health problem since its patterns is

increasing among people of all ages. In Kenya, as reported by the National Health Survey in Kenya, 9.4 % of males and females aged between 18-69 years are living a sedentary lifestyle. This is a concern the entire health professional fraternity since it directly leads to increase in the burden of these NCDs. According to WHO, unhealthy diets especially those that have high content of fats, salts, sugar and physical inactivity are among the leading causes of non-communicable diseases. NCDs affect people of all ages and regions but are often related with older ages. Children, adults and the elderly are all at risk of risk factors that are responsible for diabetes and hypertension. It is reported that at least 15 million of all NCDs death occur between the ages of 30 and 69 years (WHO, 2014). Overweight or obesity is one of the major intermediate risk factors for chronic NCDs, and at least 2.6 million people die each year as a result of NCDs caused by obesity. The Body Mass Index (BMI) can also be used as a measure for indicating a person's nutritional status. It can therefore be used as a risk indicator to screen for different weight categories that may lead to health problems. The WHO and National Institute for Health and Clinical Excellence (NICE) categorizes BMI into four major cut-off points: BMI<18.5 Kg/m2 as underweight, 18.5-24.9 kg/m2 healthy weight, 25.0-29.9kg/m2 overweight and >=30 as obesity. As the BMI increases, so does the risk to be affected by diabetes and hypertension. The goal of those people who want to achieve an optimum health should be to maintain a body mass index in the range of 18.5 to 24.9 Kg/m2. The risks of coronary heart diseases, hypertension and type 2 diabetes mellitus therefore increases steadily with the increase in an individual's body mass index (Hsu, Araneta, Kanaya, Chiang, & Fujimoto, 2015). According to a study done by (Flegal, Carroll, Kuczmarski, & Johnson, 1998) the mean BMI is rising at a worrying rate across all developed countries like America and the United Kingdom. Obesity and overweight is however not only limited to the industrialized countries as proved by the World Health Organization since its rise is also being

witnessed in most of the developing countries. The prevalence of obesity in Kenya is also worrying and the National Demographic and Health Survey of 1998 estimated that 22% of the Kenyan females aged between 45-49 years were all reported to be overweight. Socio-economic factors also have a role to play in the increasing burden of diabetes and hypertension. They are responsible with the distribution of Non-communicable diseases in both the wealthy, developing and poor countries. Research done in the developed countries shows that the prevalence of NCDs like obesity and their risk factors is high amongst those with the highest socio-economic status and wealth index (Mendez, Monteiro, & Popkin, 2005).

1.1.5 Screening of Diabetes and Hypertension

In order to deal with this global burden of NCDS, an improved healthcare system, early detection and timely treatment is required. The mortality rates of communicable diseases have surpassed that of non-communicable diseases. According to WHO, NCDs will be the leading cause of mortality come 2030. Early detection can be achieved through screening process. According to WHO, screening is the presumptive identification of undetected defects or diseases through conduction of different tests and other methods that can be done in a short period. Screening is recommended in order to have an inclusive and constant risk factors surveillance as a crucial component of Public Health transformation and also a strategy to control the increasing burden of NCDSs (WHO, 2013). Screening of any medical conditions such as diabetes and hypertension is advised especially if the disease is common and clinical screening is important. The process should be systematic ongoing and not isolated on one-time effort. There are several approaches that can be used for screening of diabetes and hypertension. The selective screening is usually done among individuals identified as being at high risk in relation to age, body and weight. Another approach

that can be used is the opportunistic screening method. This is done by a healthcare professional for reasons other than the disease in question.

In Kenya, non-communicable diseases account for more than 50% of hospital admissions, and more than 55% of hospital deaths (KNSP NCDS 2015-2020). Screening for Gestational Diabetes is still not possible in most areas since the medical society still lacks the best criteria to be used for diagnosis. Despite its high prevalence among' pregnant women there is still lack of proper diagnosis methods to deal with this burden. Different areas in Kenya still lack the required systems in place that can be used to diagnose diabetes (Hendriks et al., 2012). Hypertension on the other hand is regarded as a "silent killer" since an individual does not show any sign or symptoms when the disease is in its early stages. It is the leading and a well-known risk factor for developing circulatory diseases (Hendriks et al., 2012). Early stages of hypertension screening are therefore advised because its non-specific symptoms may begin to show when it has progressed undetected. With the increasing demand to improve living standards of people living with NCDs, a study was done in Kenya in the rural low income setting of western region so as to compare the community versus the home based screening for diabetes and hypertension(Pastakia et al., 2013).

Several factors influencing the screening of diabetes and hypertension in Kenya have been reported (Lin et al., 2016). Some of the factors includes, lack of awareness of diabetes and hypertension screening, inadequate access to healthcare facilities which have poor infrastructure. Most of the health professional especially those from the rural settings lack awareness on the need and importance of early diagnosis and treatment. Studies have also indicated that socio-economic factors have influence on the demand for screening of diabetes and hypertension. Those who come from a higher socio-economic class shows more awareness of the significance of early diagnosis of hypertension and diabetes as compared to those who come from low socio-economic settings

(Gimeno Garcia, 2012). Several studies have also addressed the association between age and demand for screening. A study done in the United States of America revealed that demand for screening services was higher among the elderly people aged 65 years and above (Lin et al., 2016).

1.1.6 Economics and Non-Communicable Diseases

Non-infectious diseases do not only pose a major threat to the human health, but also affects the growth of the economy and national development of any country. Empirical research has proven that there is a strong connection between economics and health (McGuire, Parkin, Hughes, & Gerard, 1993). Ill health can therefore affect the economic growth of any country in very many different ways. Early retirement and reduced productivity levels are examples some of the factors that may affect the economic status of any country. Disease burden usually increases the expenditures for the health system, individuals and households. The global burden of diabetes and hypertension is expected to rise as a result of increase in global population growth and increasing older population (Pefoyo et al., 2015). The global population growth has significant implications for the increasing burden of these NCDs since the older age groups are more vulnerable compared to the younger generations. The World Health Organization has improvised a macroeconomic model that is used to estimate the economic burden of Non-communicable diseases. The WHO EPIC model can be used to assess the magnitude of health's effect on growth through different ways. The first one involves the diversion of savings from capital investments to health care consumption as a result of NCD treatment while the second strategy involves reduction of labour supply due to the mortalities caused by Non-communicable diseases.

Most of the developing countries still do not have strong policies in place to deal with the burden of diabetes and hypertension. India stands to incur a total cost of 4.58 trillion dollars between 2022 and 2030 as a result of Non-communicable diseases and mental health conditions. To deal with

this economic burden, the health policy makers have decided to come up with a strategy to manage and control these chronic conditions. One promising path that is being used in India and is reaping favourable returns is the primary prevention of the NCDs through early screening and a strong healthcare infrastructure. According to (Jones, 2013), Kenya still does not have adequate funds and resources to deal with diabetes and hypertension. This could be as a result of the high costs and low availability of insulin in the country. Inadequate patient follow-up is another reason why there is poor management of these NCDs in the country.

1.2 Problem Statement

The WHO reports that NCDs are responsible for at least 60% of the global deaths and this figure will increase rapidly by the year 2030 (WHO, 2014). In Kenya a survey was done to find out the burden of these two NCDs, hypertension and diabetes. The findings revealed that close to a quarter of Kenyans had hypertension and among those who were previously diagnosed and were on treatment, only 4% had achieved control. Diabetes prevalence was recorded as 1.9% and only 7% had achieved control. The study also recommended that screening for the NCDs should be the main focus for the management of these diseases. The Kenya National strategy for the prevention and control of non-communicable illnesses 2015-2020 was established to deal with the increasing burden of non-communicable diseases. Several interventions to deal with the burden of these chronic diseases are included within this strategy. The use of this strategic framework is to give a road map towards reducing preventable morbidity and death resulting from non-communicable diseases and also to improve the quality of living for all Kenyans in line with Vision 2030. One of its objectives is to strengthen the health systems for NCD prevention and control across all levels of the health sector. This can be achieved through providing evidence-based decision tools to ensure there is appropriate and timely diagnosis and screening of the NCDs. Diabetes and

Hypertension are controllable medical conditions that can be controlled through continuous periodic surveillance to allow for early intervention and interruption in disease advancement. The continuous increasing burden of diabetes and hypertension calls for a comprehensive health response which can be used against them before they inflict severe damage. Interventions like Proper screening in Kenya must therefore be put in place to deal with the increasing burden of diabetes and hypertension.

1.3 Research questions

The study is guided by the following research questions.

a) What is the regional pattern of hypertension and Diabetes screening in Kenya?
b) What are the socioeconomic factors associated with the demand for diabetes screening in Kenya?
c) What are the most appropriate policies on hypertension and diabetes screening in Kenya?

1.4 General Objective.

The goal for the research is to establish the demand for hypertension and diabetes screening in Kenya.

1.5 Specific Objectives.

The specific objective of this study is in threefold and that is:

a) To describe regional patterns of hypertension and diabetes screening in Kenya
b) To assess socioeconomic factors associated with demand for diabetes and hypertension in Kenya
c) To come up with policy options from the findings of the assessment of socioeconomic factors associated with demand for diabetes and hypertension screening in Kenya

1.6 Significance of the study

There is an obvious gap between the 10 million patients diagnosed and the 6 million of them who were just diagnosed by chance. Study has immense contribution to the field of Health economics and Public health. The study findings may form a basis for further research on the demand for diabetes and hypertension screening in Kenya. This could lead to generation of new ideas for the better and more pragmatic ideas of addressing the catastrophic health expenditure to individuals that rises as a result of NCDS and the economic burden of hypertension and diabetes in the country.

Policy makers have no clear understanding on the national outlook of the effects of these diseases. This study therefore aims to fill this gap between diagnosis and screening by analysing the demand for diabetes and hypertension screening in Kenya. Information gained from this study shall potentially contribute towards policy by enabling policy makers develop a holistic approach to the problem.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter basically review the empirical and theoretical basis upon which the research will be based on and existing literatures on the study variables. This chapter allow this study to appreciate the ideas and findings of other scholars which have been borrowed by the study.

2.2 Theoretical Literature Review

Studies have shown that human health related behaviours such as demand for health services can be explained by different health theories and or models. The models and theories underpinning the demand for health services such as disease screening includes, health belief model, the Grossman's model and theory of reasoned action.

2.2.1 The Grossman's model on demand for healthcare

According to economists, demand is referred to as the ability to acquire goods and services. The demand is based on a person's preferences, implying that, the extent to which a given healthcare fulfils the person's preferences for health will define its level of demand. Grossman's model on demand for health services (1972) shows that, demand for healthcare is associated with demand for good health, implying that, factors that affect the demand for good health, also influence the demand for healthcare services such as hypertension and diabetes screening. This also implies that healthcare is an input in the health production function i.e. health care is needed to maintain or improve a certain health stock.

The Grossman's model also indicates that consumers demand "good health" for two reasons: as an investment good "good health" increase the number of healthy days that permit nonmarket and market undertakings, indicating that an increase in health stock will reduce the quantity of time

lost away from the market and nonmarket activities and the monetary value of this decrease is an index of the return to an investment in health and secondly as a consumption good "good health" improves welfare or utility and therefore it directly goes in a consumer's utility function, implying that sick days become a source of no utility. In such a case an individual will derive utility from consuming both health goods and non-health goods which will in turn generate utility (Santerre & Neun, 2010). Since health is pleasant and permits one to engage in household and market activities it is assumed to be desirable; but it is not the only desirable thing in life thus explaining the differences in various utility functions (Wagstaff, 1986).

2.2.2 Health belief model

The health belief model was developed in 1966 by Rosenstock. The development of this model was motivated by a study of the reasons people have for declining or seeking health services. Initially the model the model had four constructs namely: perceived predisposition (perceived possibility of getting the disease), perceived danger (the consequences of having the disease), perceived barriers (factors that interfere with and facilitate the adoption of health seeking behaviour), and seeming cost of adherence to the anticipated treatment.

The health belief model was later modified by Becker and colleagues in 1970s and 1980s to comprise people's reactions to illness and symptoms adherence to medical instructions. The model was extended to consist of illness behaviours, preventive actions, and disease screening. The model also includes, demographic factors(gender and age), socio-physiological factors (socio-economic status, coping strategies, personalities), perceived self-efficacy (ability to adopt positive behaviours), cues to action (factors that encourages preventive actions such as persuasive talk, personal experience, seeking information from professionals), health motivation, perceived control and perceived threat(Becker & Maiman, 1975). The health model is extensively used to explain

positive health behaviours and general health behaviours. However, initially this model was only used to explain health behaviours as a result of chronic diseases such hypertension, diabetes, cancer, HIV/AIDS among others. According to the health belief model, positive health related action taken by a patient when the health service is cost and outcome effective .

A study conducted among African American women with diabetes found that patient related factors including health literacy, denial, family experience, self-efficacy and level of education showed significant association with demand for diabetes screening (Peek et al., 2009).According literatures, the findings of many studies across the world have shown the validity of the health belief model. A study conducted in Tanzania found that people are more likely to seek for treatment when they have no symptoms related any of the chronic diseases and when the cos for treatment is low. The study further concluded that those who had no symptoms and those who could not afford to pay for the screening test were reluctant to seek for screening test(Bovet et al., 2008)

2.2.3 Theory of reasoned action

This theory was established by Ajzen and Fishbein in 1980 and is used to explain individual's behaviour. The theory argues that an individual's behaviour is characterised by his or her intention towards the behaviour. Fishbein and Ajzen agreed that people are usually rational and they adopt only important information and consider the implications of their actions before they make any decision regarding a behaviour (Fishbein, Jaccard, Davidson, Ajzen, & Loken, 1980). This theory has three concepts namely: subjective norms, behavioural intention, and attitude. Subjective norms are the perceived expectation other individuals such as family members, co-workers and professionals. Voluntary behaviours such as demand for health services is determined by one's

attitude towards that behaviour and what others will perceive if the behaviour is not executed (Fishbein & Ajzen, 1975).

A research done in the United States revealed that a common reason for not seeking for hypertension screening is having negative attitude towards hypertension treatment and personal health beliefs(Hyman & Pavlik, 2001). Studies have indicated that Level of education and religion are two factors that often influence one's attitude towards certain health practices (Osamor & Owumi, 2011). Researchers have found that negative attitude towards diabetes is a key factor for low participation diabetes screening (Hipwell et al., 2014). Attitude towards diabetes screening can change with positive beliefs on the expected outcomes expected from screening services. Attitude can be referred to as personal belief towards what action someone should take regarding certain condition which eventually determines whether they seek screening or not.

2.3 Empirical Literature Review

Studies have been done about demand for hypertension and diabetes screening in both the developed and developing world. According to literatures, factors associated with the demand for hypertension and diabetes screenings are categorised into two groups: environmental and individual factors. Individual factors are divided into emotional and cognitive factors, while environmental factors are divided into socio-economic factors, physical factors and health system factors. The research done also shows that there is direct association of demand for diabetes and hypertension screening and demographic factors like age, gender, place of residence, emotional factors and health system factors (Daniel Mwai and Moses Muriithi 2015)

A qualitative study conducted by Naanyu (2016) on obstacles faced by linkage to hypertension care in Western Kenya revealed that cognitive factors such as apparent benefits, perceived obstacles, self-efficacy and cues to action were associated with linkage to hypertension care. In

regards to perceived benefits, majority of the individuals interviewed in this study did not fully understand and appreciate the benefits of hypertension screening. Some respondents revealed that, they were not willing to leave their daily activities to go and stay for hours in ques waiting for services, especially in a health facility where services are very poor. In regards to self-efficacy, alcohol use was reported to be obstructing self-efficacy. According to the study's finding heavy alcohol use is associated with an individual inability to make an informed decision on the course of health management the physician may recommend they adopt. In regards to cues of action, the majority of the respondent felt that, limited information regarding screening services is associated with low demand for screening services. The finding of the study further revealed that lack of or limited exposure to information on hypertension screening services is associated with level of education, area of residence and occupation. The cognitive factors like perceived benefits, perceived obstacles, self-efficacy and cues to action were therefore reported to positively affect the demand for hypertension and Diabetes screening.

According to Naanyu et al. (2016), emotional factors basically known as fears are associated with individual's decision to seek hypertension screening. This includes anxiety of being screened for chronic illnesses such as, hypertension, diabetes among others. The study also reported that physical factor such as distance to the nearby hospital was associated with demand for screening. Long distance to the nearby health centre discouraged individual from seeking health services. The finding of the study found that poverty was associated with seeking hypertension screening. Lack of money to afford transportation cost, hospital bills, and drugs may discourage an individual from initiating care. The study further revealed that gender was associated with money problems. Making financial related decision is a barrier among women. The study found that women could not make decision related access to health care without consulting men. Women have to seek

permission and financial assistance from their husbands in order to initiate care, which leads to delay in initiating care among women. Distance, poverty and gender were therefore reported to positively affect the demand for hypertension and diabetes screening.

Health system factors are related to health care seeking. A study conducted by Naanyu showed that health system factors such as poor quality of care and physician-patient relationship were associated with health care seeking. The study further showed that evidences of poor quality of care includes, inadequate drugs, inadequacy of proper equipment, and inadequate human resources, while poor patient-physician relationship was evidenced by absenteeism, corruption, language barrier, poor services and mistreatment by the physician. The study also revealed that existence of alternative treatments such as herbal care that are widely advertised in the country is also associated with health care seeking (Naanyu et al., 2016). Majority of individual opted to seek medical care from herbal clinics rather than pharmacies. It was therefore reported that these health system factors had undesirable influence, and positively affected the demand for hypertension and diabetes screening.

A study conducted in Lagos, Nigeria on low uptake of hypertension screening revealed that age contributed to the ineffectiveness of the screening event(Nelissen, 2018). The study found that those who were less than 35 years of age were more likely to enrol for the screening event compared to those who were above 35 years of age. This is in contrast with the outcome of a study done in rural Uganda which revealed that those who were 60 years and beyond were more likely to seek screening test compared to those who were 29 years and below (Kotwani et al., 2014). Nelissen (2018) further revealed that the physician-patient relationship is an important factor related to health service seeking behaviour and retention in care.

The result from an evaluation of linkage to hypertension care done in rural Uganda revealed that female participants were 14.4% more likely seek screening services compared to men (Kotwani et al., 2014). In regards to education, the study indicated that high level of education had positive association with likelihood of seeking screening test. In regards to occupation, manual workers were likely to go for screening services compared to those who were not employed. The study also revealed that tobacco consumption was related to increased possibility of initiating care (RD=11.4%, 95% CI 2.4, 20.4). The study further revealed that 59% of the participants reported that, high cost of transport was a hindrance to health care seeking behaviour, while 33% reported that transportation inconveniences was related with likelihood of not seeking health care (Kotwani et al., 2014).

A prospective study on low utilization of health care services conducted in Dares salaam, Tanzania showed that history of hypertension and age were associated with the demand for hypertension screening. Those who were older (45-64 years) were 2.11 most likely to demand for health care compared to those who were below 45 years of age, while those who had history of hypertension in their family were 1.53 times likely to demand for hypertension screening services compared to those who had none (Bovet et al., 2008). The findings of the study also revealed that a person's weight, smoking status, history of hypertension, level of education, blood pressure level and wealth had no association with health care seeking behaviour. The study further reported that among 115 of 161 individuals who did not seek health care services for hypertension, about 40% argued that the primary reason for not seeking health services care was the absence of symptoms related to hypertension, while 15% reported that the key reason they did not seek health care was because of high cost of health care services and treatment (Bovet et al., 2008).

A research done in England on uptake of diabetic retinopathy screening showed that inability to afford transport cost was related with poor health seeking behaviour(Lindenmeyer et al., 2014). The study further revealed that informing patients about the importance of diabetes screening was associated with higher demand for diabetes screening. According to a study conducted by Leese (2008) in Tayside, Scotland, Age, history of hypertension, smoking and area of residence were associated with demand for diabetes screening, while geographical accessibility and sex had no association with demand for diabetes screening. In regards to age, the study indicated that young people were more likely to miss screening compared to the old. The study finding also revealed that nonattendance to diabetes screening was more common among individuals living in urban places compared to rural places. In regard to hypertension history, patients with history of hypertension in their lineage were more likely to miss screening. Those who smoked were also more likely to miss diabetes screening.

A study conducted by Sachdeva (2012) with an aim to identify factors related to non-attendance for diabetic retinopathy screening services revealed that age was associated with diabetes screening non-attendance, while gender had no association with screening attendance. In regards to age, the rate of attendance for diabetes screening was higher among adults aged 75 years and above (49%), followed by those who were aged between 65 to 74 years of age (68%) and lastly those who were aged below 55 years (49%).

A qualitative study on factors associated with attendance by diabetic individuals at ophthalmic outpatient clinics conducted in United Kingdom revealed that attitudinal barriers such as misconception about the disease, diabetes management and fear influences demand for screening. Furthermore, the study indicated that negative experiences of a person (such as dissatisfaction with outcome, waiting list and difficulties with appointments) resulted to anxieties and doubts making

the individual reluctance to seek for health care. The study further suggested that experiences by a patient can be improved when there in a good physician-patient relationship.

2.4 Overview of Literature Review

According to the literatures, some of the findings of the studies concur while others do not. Majority of the studies discussed in the literatures focused on factors influencing the demand and linkage to diabetes and hypertension screening. The factors discussed in the literature includes, alcohol use, education level, distance to the nearby health facility, transportation cost, gender, physician-patient relationship, availability of alternatives, age, occupation, tobacco use, history of hypertension, availability of symptoms, cost of screening area of residence and weight.

According to the literature that has been reviewed, the following factors were found to affect the demand for diabetes and hypertension screening positively. In regards to level of education, studies done by Naanyu(2016), Katwan(2014) and Peek(2009), revealed that higher education level is associated positively with demand for diabetes and hypertension screening. These studies argue that higher education level has positive impact on level of awareness on diabetes and hypertension screening.

A research by Kotwani et al. (2014) and Linden Meyer et al. (2014) showed that Economic factors like high cost of transport and high occupation level was associated with health seeking behaviour. However, the finding of a research conducted by Bovet et al., (2008) contrast with this finding. According to Bovet et al., (2008), there is no association between cost of transport and health care seeking behaviour. Increased cost of transport could hinder visits to the health facility especially among those who came for far places.

The findings of researches conducted by Kotwani et al. (2014), Bovet et al. (2008) and Leese (2018) showed that old age had a positive impact when it comes to demand for diabetes and hypertension screening. On the gender issue studies revealed that women showed more interest on seeking health care compared to men (Kotwani et al., 2014; Sachdeva, Stratton, Unwin, Moreton, & Scanlon, 2012). Kotwani et al., (2014) added that women were 14.4% more likely to seek medical care compared to men. However, this was in contrast with a study conducted by Sachdeva (2012) and Naanyu (2016).

Findings of studies conducted by Bovet et al. (2008) and Leese (2008) agreed that those who had history of hypertension and diabetes in the family lineage were most likely to seek hypertension and diabetes screening compared to those who had none. In regards to tobacco use a study conducted by Kotwani showed that those who were smoking showed more interest in seeking screening services compared to non-smokers.

Finally, several studies have been done to find out about the demand for diabetes and hypertension screening, but there seems to be no agreement when it comes to the results. This study is therefore different from others because it will form a basis for further research on the demand for diabetes and hypertension screening in Kenya. This could lead to generation of new ideas for the better and more pragmatic ideas of addressing the burden of hypertension and diabetes in the country.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter elaborates on methodologies intended to be adopted in order to achieve the objectives of this study. It consists of the conceptual framework of the study, econometric model for the study, definition of the study variables, data source, data management and data analysis.

3.1 Study Conceptual Framework

Figure 1 Conceptual framework of the study

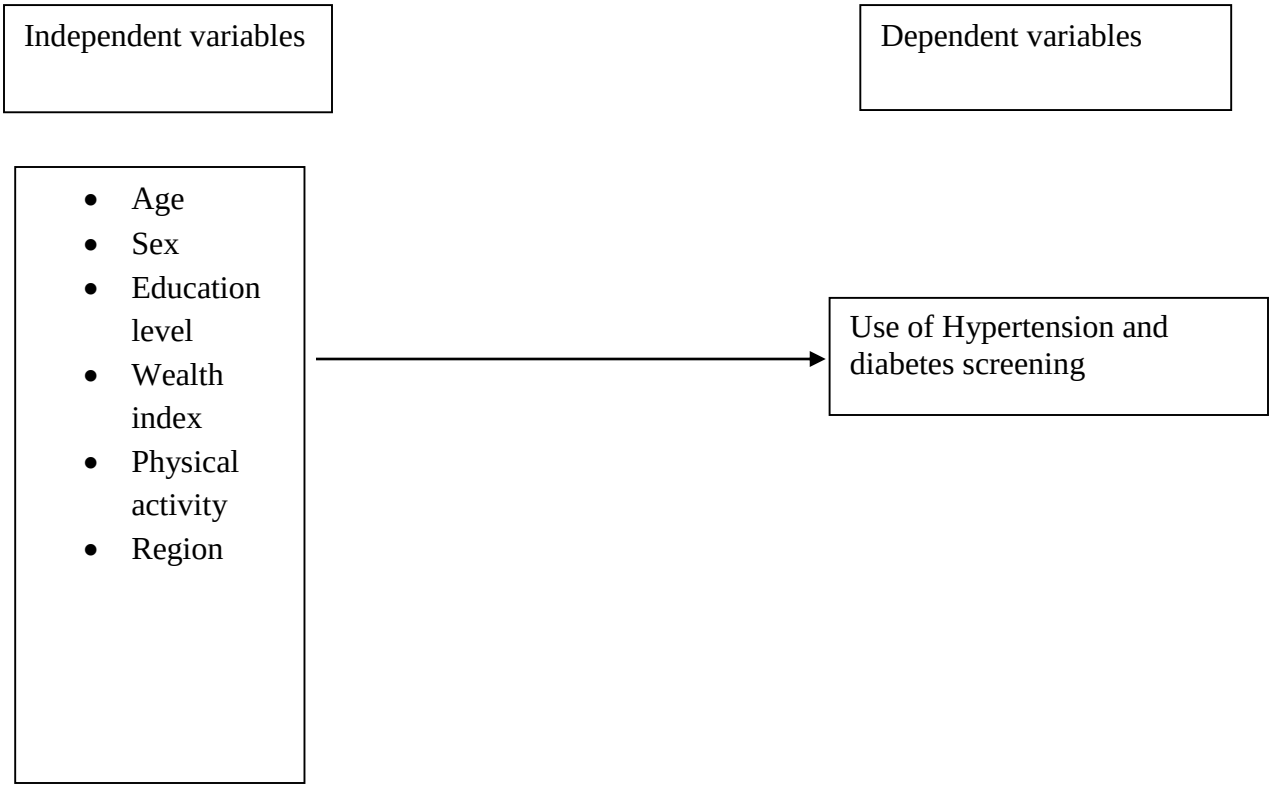

Figure 2 Conceptual framework of the study

According to literatures, the possible independent variables affecting the use of hypertension and diabetes screening includes, age, residence, education level, wealth index, tobacco use, alcohol use and region of residence. The literatures further reveals that, government policy and attitude are possible modifying factors on the impacts of independent factors on the use of hypertension and

diabetes screening. The outcome variable in this study is the use of hypertension and diabetes screening.

3.2Model specification and Estimation

This study regards the demand of healthcare as the use of hypertension and diabetes screening in a given population. Given that these two measurements (use of hypertension screening and diabetes screening) will be made on each observation, a bivariate probit model will be adopted. Using a probit regression model the dependent variables will take values: l if individual went for screening and 0 if the individuals did not go for screening. This model assumes that the error is normally distributed. A probit regression model is adopted to show whether there will be positive, negative or no association between demand for screening and the independent variables. Based on the theoretical framework, factors that determine uptake of hypertension and diabetes screening in Kenya will be explored using binary probit regression model that lies on an interval of between 0 and 1.

This relationship is being expressed as:

$$Y_i = \begin{cases} 1 \text{ if the event takes place (an individual uses hypertension and diabetes screening)} \\ 0 \text{ otherwise} \end{cases}$$

Equation (1) expressing the demand for healthcare can then be rewritten as:

$$y^*_i = x_i{}' \beta + \varepsilon_i$$

Where:

y^*_i is variable showing the probability that healthcare is or not sought,

$x_i{}'$ is a vector of variables related to the individual, household and community

β is a vector of parameters and

ε_i error term

$Y = 1$ *if* $y^*_i > 0$ *i.e* $(x_i{}'\beta + \varepsilon_i) > 0$ and

$Y = 1$ *if* $y^*_i < 0$ *i.e* $(x_i{}'\beta + \varepsilon_i) < 0$

The values 0 and 1 are used in order to allow the definition of probability of occurrence of an event as a mathematical expectation of the variable Y.

This study aims to establish the relationship between the independent variables and the outcome variables. The dependent variable in this study is the use of hypertension and diabetes screening while the independent variables include age, residence, education level, household wealth index, tobacco use, alcohol use and region. According to literatures government policies and attitude are possible intervening variables used to explain the relationship between the predictor variables and the outcome factor as shown in the figure above.

3.3 Definition, Measurement and Expected Signs of Variables

The dependent and predictor variables are explained in table 1 below: the signs show either positive or negative relationship between the predictor variables and the predicted variable as indicated in the background of this study.

Table 1 Summary definition and Measurement

Variable Name	Definition	Measurement	Expected Sign
Dependent variable			
hypertension and diabetes screening	Use hypertension and diabetes screening	1=Yes 0 otherwise	Positive
Independent variables			
Age	Age of household head	Categorical variable 15-19=1 20-24=2 25-29=3 30-34=4 35-39=5 40-44=6 45-49=7	Positive (Kotwani et al., 2014)
Sex	Gender of the household head	Categorical variable: 1 if male 0 otherwise	Positive (Lindenmeyer et al., 2014)
household wealth index	Wealth status of the household.	Categorical variable: Poorest=1 Poorer=2 Middle=3 Richer=4 Richest=5	Positive(Kotwani et al., 2014)
Education level	Education level of household head.	No education=1 Primary=2 Secondary=3 Higher=4	Positive (Naanyu et al., 2016)

Variable Name	Definition/Measurement	Measurement	Expected Sign

Residence	Area of residence.	Categorical variable: 1 Urban 2 Rural	Positive (Leese et al., 2008)
Physical activity	Whether the household head doing physical activities or not	Categorical variable 1 Yes 0 otherwise	Positive(Grundy et al., 2000)
Region	Region of residence of the household head.	Coast=1 North Eastern = 2 Eastern=3 Central =4 Rift Valley=5 Western=6 Nyanza=7 Nairobi=8	Positive (Leese et al., 2008)

3.4 Data Source

This study will use a secondary cross section KDHS 2014 data. The data will be obtained from Demographic Health Survey program website. The data comprise of information on demographic and socio-economic activities of individuals in the entire country.

3.5 Data management and analysis

The KDHS, 2014 data is already entered, cleaned and validated. The data is stored in stata format and is obtained from the Demographic Health Survey program website. In this study, data analysis and further data management will be done using stata version 14.

Multicollinearity test will be done by calculation of collinearity matrices to check for inter-correlation between the independent variables. Highly correlated variables will be excluded to avoid inflated coefficients which may affect the interpretation of the results. Descriptive analysis will be performed to establish the demand for screening across all the socio-demographic groups. To achieve the objectives, frequency and percentage will be used to describe the data. The results will be presented using frequency distribution table, percentages, graphs and charts.

The study will use a probit model to investigate the relationship between the dependent variable and the predictor variables. Positive Coefficients will be showing positive associations between the outcome variable and the predicted variables while negative Coefficients will be showing negative relationship between the outcome and the predicted variables at 95% confidence interval. Only coefficients with a probability value less than 0.05 will be regarded significant.

CHAPTER FOUR: DATA ANALYSIS, INTEPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the empirical results of the demand for hypertension and diabetes screening in Kenya. The study utilizes the probit regression model in establishing the demand for hypertension and diabetes screening. Tables are used in the presentation of results. It commences with descriptive statistics that give a summary of the variables, diagnostic tests which are then followed by the results of the model.

4.2 Descriptive Statistics.

Table 2: Frequency and Percentage of Variables

variable	Code	Frequency	Percentage
Screening	Yes	112	0.76
	No	14,618	99.24
Age	15-19	6,074	19.55
	20-24	5,404	17.39
	25-29	5,936	19.11
	30-34	4,452	14.33
	35-39	3,867	12.45
	40-44	2,985	9.61
	45-49	2,350	7.56
Sex	Male	19,330	62.20
	Female	11,749	37.80
Household Wealth Index	poorest	7,260	23.37
	poorer	5,969	19.21
	middle	5,946	19.14
	richer	5,955	19.17
Education Level	richest	5,938	19.11
	No education	4,181	13.46
	Primary Education	15,610	50.24
	Secondary Education	8,591	27.65
	Higher Education	2,686	8.65
Physical Activity	Yes	3,848	26.12
	No	10,882	73.88
	Coast	3,900	12.55
	North Eastern	1,664	5.36
	Eastern	5,247	16.89
	Central	3,114	10.02
	Rift Valley	9,053	29.14
	Western	2,840	9.14
	Nyanza	4,251	13.68
	Nairobi	999	3.22

Source: Author (2019).

In Kenya only 112 (0.76%) of the respondents were screened for both hypertension and diabetes while 14,618 (99.24%) were not screened for both ailments. According to the age bracket, 6074 respondents who belong to the 15-19 age bracket were screened, 5904 who belong to the 20-24 age bracket, 5936 belonged to the 25-29 age bracket, 4452 belonged to the 30-34 age bracket,3867 belonged to the 35-39 age , 2985 belonged to the 40-44 age bracket while 2350 belonged to the 45-49 age bracket respectively. The number of males who were screened for hypertension and diabetes ailment were 19330 (62.20%) while the number of the females was11749 (37.80%).In the household wealth index category 7260 of the poorest were screened, 5969 who were poorer, 5946 who were rich, 5955 who were richer and 5938 who were the richest.

According to the level of education 4181 respondents with no education were screened, 15610 with primary education, 8591 with secondary education and 2686 with higher education were screened for both hypertension and diabetes respectively. Of the respondents interviewed, 3848 (26.12%) of them do engage in physical activities while 10882 (73.88%) do not engage in any physical activity. Also a total of 31068 respondents were screened across all the regions (former provinces) respectively of which 3900, 1664. 5247, 3114, 9053, 2840, 4251, 999 were from coast province, North Eastern, Eastern, Central, Rift Valley, Western, Nyanza and Nairobi respectively

Table 3: Descriptive Statistics Summary

Shapiro-Wilk W test for normal data				
Variable	Obs W	V	z	Prob>z
screening	14,730 0.98217	123.526	13.023	0.00000
20-24	31,068 0.99973	3.431	3.389	0.00035
25-29	31,068 0.99977	2.934	2.959	0.00154
30-34	31,068 0.99964	4.598	4.194	0.00001
35-39	31,068 0.99956	5.581	4.727	0.00000
40-44	31,068 0.99939	7.748	5.629	0.00000
45-49	31,068 0.99920	10.260	6.400	0.00000
sex	31,068 0.99997	0.446	-2.220	0.98680
wthidx2	31,068 0.99977	2.906	2.933	0.00168
wthidx3	31,068 0.99977	2.926	2.951	0.00158
wthidx4	31,068 0.99977	2.918	2.944	0.00162
wthidx5	31,068 0.99977	2.932	2.958	0.00155
edulevel2	31,068 1.00000	0.039	-8.922	1.00000
edulevel3	31,068 0.99989	1.352	0.829	0.20349
edulevel4	31,068 0.99931	8.788	5.975	0.00000
physicactiv	14,730 0.99974	1.781	1.561	0.05922
region2	31,068 0.99882	15.028	7.450	0.00000
region3	31,068 0.99972	3.596	3.518	0.00022
region4	31,068 0.99942	7.358	5.487	0.00000
region5	31,068 0.99991	1.173	0.438	0.33087
region6	31,068 0.99936	8.226	5.793	0.00000
region7	31,068 0.99962	4.907	4.373	0.00001
region8	31,068 0.99799	25.672	8.922	0.00000

Source: Author (2019).

The study results show that on average of 0.76% of the respondents were screened for both diabetes and hypertension ailments. That implies that 99.24% of the respondents were not screened for both ailments. Over 48.5% of the respondents who were screened were male while 51.5% were female. On average 26.12% of the respondents who are engaged in physical activity were screened for diabetes and hypertension with a variance of 48%.

4.3 Multicollinearity Test

Table 4: Variance Inflation Factor

Variable	VIF	1/VIF
edulevel3	3.54	0.282450
edulevel2	3.45	0.289768
region5	2.42	0.413199
wthidx5	2.16	0.463796
edulevel4	2.14	0.467434
region3	2.00	0.498900
region7	1.94	0.516389
wthidx4	1.90	0.526508
wthidx3	1.83	0.545268
wthidx2	1.79	0.559321
region4	1.73	0.576925
age3	1.72	0.581748
region6	1.71	0.585412
age2	1.61	0.620664
age4	1.57	0.638000
region2	1.52	0.656752
age5	1.51	0.660553
age6	1.41	0.710162
age7	1.35	0.739646
region8	1.28	0.782385
physicactiv	1.08	0.926071
sex	1.02	0.982637
Mean VIF	1.85	

Source: Author (2019).

Predictor variables that are linearly related can cause problems when estimating the regression coefficients. To remedy this, we need to conduct multicollinearity tests using the Variance Inflation Factor (VIF). From the results, we can deduce that multicollinearity is not a problem for all the variables under consideration. The rule of thumb states that any variable whose VIF is >10 or its tolerance level (1/VIF) is less than 0.1 may merit further investigations. It is because those variables are linear combinations of other variables. In our case all the variables are way below a VIF of 10 and their tolerance levels are all above the 0.1 mark hence we can deduce that multicollinearity is not a problem

4.4 Heteroscedasticity Test

Table 5: Breusch-Pagan/ Cook Weisberg test.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of age
chi2(1) 2810.87
Prob > chi2 = 0.0000

Source: Author (2019).

Cross-sectional data often have a profound disparity between large and small values hence they are more likely to have heteroscedasticity. Here we test the null hypothesis of constant variance (homoscedasticity) against the alternative hypothesis of the presence of heteroscedasticity. If the p value (Prob>chi2) is < 0.05 we reject the null hypothesis and state that heteroscedasticity is present. Otherwise we fail to reject the null hypothesis and conclude that heteroscedasticity is not an issue. In this case p-value (Prob>chi2) which is 0.0000 is less than the significance level 0.05 hence we reject the null hypothesis and conclude that that there is presence of heteroscedasticity.

4.5 Normality Test

Table 6: Normality Test

		Shapiro-Wilk W test for normal data				
Variable	Obs W	Skewness	kurtosis	V	z	Prob>z
screening	14,730 0.98217	0.000	0.000	123.526	13.023	0.00000
age2	31,068 0.99973	0.000	0.000	3.431	3.389	0.00035
age3	31,068 0.99977	0.000	0.000	2.934	2.959	0.00154
age4	31,068 0.99964	0.000	0.000	4.598	4.194	0.00001
age5	31,068 0.99956	0.000	0.000	5.581	4.727	0.00000
age6	31,068 0.99939	0.000	0.000	7.748	5.629	0.00000
age7	31,068 0.99920	0.000	0.000	10.260	6.400	0.00000
sex	31,068 0.99997	0.000	0.000	0.446	-2.220	0.98680
wthidx2	31,068 0.99977	0.000	0.000	2.906	2.933	0.00168
wthidx3	31,068 0.99977	0.000	0.000	2.926	2.951	0.00158
wthidx4	31,068 0.99977	0.000	0.000	2.918	2.944	0.00162
wthidx5	31,068 0.99977	0.000	0.000	2.932	2.958	0.00155
edulevel2	31,068 1.00000	0.000	0.000	0.039	-8.922	1.00000
edulevel3	31,068 0.99989	0.000	0.000	1.352	0.829	0.20349
edulevel4	31,068 0.99931	0.000	0.000	8.788	5.975	0.00000
physicactiv	14,730 0.99974	0.000	0.000	1.781	1.561	0.05922
region2	31,068 0.99882	0.000	0.000	15.028	7.450	0.00000
region3	31,068 0.99972	0.000	0.000	3.596	3.518	0.00022
region4	31,068 0.99942	0.000	0.000	7.358	5.487	0.00000
region5	31,068 0.99991	0.000	0.000	1.173	0.438	0.33087
region6	31,068 0.99936	0.000	0.000	8.226	5.793	0.00000
region7	31,068 0.99962	0.000	0.000	4.907	4.373	0.00001
region8	31,068 0.99799	0.000	0.000	25.672	8.922	0.00000

Source: Author (2019).

The study did a Shapiro-Wilk normality test at 5% significance level($\propto = 0.05$). If Prob>Z (the p-value) is less than 0.05 it signifies non-normality hence reject H_0 that the data is normally distributed while any value greater than 0.05 signifies normality hence we hail to reject H_0 . According to the results from the table above sex, primary education, secondary education, physical activity, and Rift Valley region values are greater than 0.05 meaning that they are

normally distributed while screening, age, wealth index, education level and region values are greater than 0.05 hence they are not normally distributed..

A symmetric distribution is one where the left and right hand sides of the distribution are roughly equally balanced around the mean. Skewness and Kurtosis measures the behavior of the variables. Skewness indicates how the symmetrical the data is i.e. if it looks the same both to the left and to the right from the centre or lack of it. Symmetric values are skewed towards the zero value. Positive values showcase that the data is skewed towards the right while negative values showcase the data is skewed towards the left. Kurtosis measures whether the data is heavy or light-tailed in comparison to a normal distribution curve. A normal distribution standard kurtosis is between zero and three. Data with very high kurtosis tends to have outliers or heavy tails. Those with low kurtosis or lack of outliers or tends to have light tails. Table 6 above indicates that all the variables under study are symmetric because they are skewed towards zero hence a normal distribution is assumed. Screening, age, education level, physical activity and region had a kurtosis of zero while sex and wealth index had no kurtosis.

4.6 Econometric Estimation.

To explore and comprehend the demand for screening diabetes and hypertension, this study conducted a probit regression model in order to estimate how age, sex, household wealth index, education level, physical activity, and region affect the demand for hypertension and diabetes screening. Probit regressions coefficients are interpreted as changes in probit indexes or Marginal effects. Hence the study will utilise the marginal effects from the probit regression to capture the coefficient of the variables under study

Table 7: Probit Regression

screening	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
age2	0.401	0.025	16.33	0.000	0.353	0.449	***
age3	0.435	0.024	18.21	0.000	0.388	0.482	***
age4	0.419	0.025	17.07	0.000	0.371	0.467	***
age5	0.348	0.027	13.07	0.000	0.296	0.400	***
age6	0.728	0.024	30.04	0.000	0.680	0.775	***
age7	0.651	0.026	25.12	0.000	0.600	0.702	***
sex	-0.081	0.012	-7.02	0.000	-0.104	-0.059	***
wthidx2	0.131	0.018	7.49	0.000	0.097	0.165	***
wthidx3	-0.104	0.020	-5.33	0.000	-0.143	-0.066	***
wthidx4	-0.014	0.018	-0.78	0.435	-0.050	0.021	
wthidx5	-0.084	0.020	-4.10	0.000	-0.124	-0.044	***
edulevel2	-0.188	0.018	-10.19	0.000	-0.224	-0.152	***
edulevel3	-0.032	0.021	-1.53	0.126	-0.072	0.009	
edulevel4	-0.160	0.028	-5.79	0.000	-0.214	-0.106	***
physicactiv	0.069	0.012	5.77	0.000	0.046	0.093	***
region2	0.074	0.029	2.50	0.012	0.016	0.131	**
region3	-0.002	0.021	-0.12	0.909	-0.043	0.039	
region4	0.082	0.022	3.69	0.000	0.039	0.126	***
region5	-0.040	0.019	-2.15	0.031	-0.077	-0.004	**
region6	-0.059	0.025	-2.37	0.018	-0.108	-0.010	**
region7	-0.140	0.024	-5.85	0.000	-0.186	-0.093	***
region8	0.282	0.030	9.49	0.000	0.224	0.340	***
Constant	-2.690	0.032	-83.35	0.000	-2.753	-2.626	***

Mean dependent var	0.008	SD dependent var	0.087
Pseudo r-squared	0.036	Number of obs	660452.000
Chi-square	2688.512	Prob > chi2	0.000
Akaike crit. (AIC)	50323.273	Bayesian crit. (BIC)	50585.488

**** p<0.01, ** p<0.05, * p<0.1*

Source: Author (2019).

From the probit regression in Table 8, the study found a p value of 0.0000 which was less than 1% implying that the variables under consideration were significant at 1% level in explaining the demand for diabetes and hypertension screening hence thus the variables fits perfectly with the model.

Table 8: Marginal Effects

variable	dy/dx	Std.Err.	z	P>z	[	95%	C.I.	]	X
age2*	0.009	0.001	12.330	0.000	0.007	0.010	0.177		
age3*	0.010	0.001	13.650	0.000	0.008	0.011	0.195		
age4*	0.010	0.001	12.440	0.000	0.008	0.011	0.145		
age5*	0.007	0.001	9.860	0.000	0.006	0.009	0.124		
age6*	0.025	0.001	17.630	0.000	0.022	0.027	0.092		
age7*	0.021	0.001	15.220	0.000	0.018	0.023	0.077		
sex	-0.001	0.000	-7.120	0.000	-0.002	-0.001	1.399		
wthidx2*	0.002	0.000	6.730	0.000	0.002	0.003	0.197		
wthidx3*	-0.001	0.000	-5.800	0.000	-0.002	-0.001	0.196		
wthidx4*	-0.000	0.000	-0.790	0.430	-0.001	0.000	0.202		
wthidx5*	-0.001	0.000	-4.370	0.000	-0.002	-0.001	0.203		
edulev~2*	-0.003	0.000	-9.860	0.000	-0.003	-0.002	0.512		
edulev~3*	-0.000	0.000	-1.560	0.119	-0.001	0.000	0.284		
edulev~4*	-0.002	0.000	-6.870	0.000	-0.003	-0.001	0.090		
physic~v*	0.001	0.000	5.560	0.000	0.001	0.001	0.267		
region2*	0.001	0.001	2.300	0.021	0.000	0.002	0.041		
region3*	-0.000	0.000	-0.110	0.909	-0.001	0.001	0.157		
region4*	0.001	0.000	3.390	0.001	0.001	0.002	0.110		
region5*	-0.001	0.000	-2.210	0.027	-0.001	-0.000	0.288		
region6*	-0.001	0.000	-2.520	0.012	-0.001	-0.000	0.102		
region7*	-0.002	0.000	-6.710	0.000	-0.002	-0.001	0.139		
region8*	0.006	0.001	6.940	0.000	0.004	0.008	0.035		

Source: Author (2019).

4.7 Discussion of results

It was found that the likelihood for screening for hypertension and diabetes increased slightly as the age increased. The results showcase that an additional year in the age bracket increased the demand for hypertension and diabetes screening by 0.9%, 1%, 1%, 0.7%, 2.5%, and 2.1 % respectively. This may be explained by the fact that older people are more at risk of having high blood pressure or diabetes as seen in various studies (Basu & Millett, 2013; Echouffo-Tcheugui et al., 2012). It would therefore make sense for the older members of the population to be more concerned about these ailments. The study findings are supported by Ferrara et al (2009) who found that the likelihood for screening for diabetes increased with age and Kotwani et al., (2014)

who determined that people who are older than 60 years were more likely to be screened compared to those between 18 and 29 years. (Ferrara, Peng, & Kim, 2009; Kotwani et al., 2014)**.**

The study found that sex was negatively significant in influencing the demand for screening diabetes and hypertension. The fact that the respondent were males meant that the demand for screening hypertension and diabetes reduced by 0.1% .The study agrees with (Mehmood et al., 2018; Nijhof, Ter Hoeven, & de Jong, 2008) who stated that in the United States females were more likely to be screened for diabetes than the males and in Pakistan females were more likely to get their blood pressure checked.

The fact that the respondent was in the poorer wealth quintile increased the chance for screening for diabetes and hypertension by 0.2%. On average the fact that a respondent was in the middle, richer and richest wealth quintile range reduced the chance for hypertension and diabetes screening by 0.01%, 0.001%, and 0.9% respectively. The study showed that a higher economic status reduced the demand for screening hypertension and diabetes. It differs with (Mehmood et al., 2018; Zack et al., 2016) who found that most people screened for hypertension had higher socio-economic status. Their findings also established that wealth was significantly associated with screening and the likelihood increased as the amount of wealth increased and that poorer people were least likely to know that they had high blood pressure.

The study found out that an improvement in the level of education decreased the demand for hypertension and diabetes screening. An improvement in the education level decreased the demand for hypertension and diabetes screening at the primary, secondary and higher level by 0.3%, 0.01% and 0.2% respectively.

Physical activity was found to have a positive and significant influence on the need for hypertension and diabetes screening. The respondents who engaged in any physical activity were 0.11% more likely to go for diabetes and hypertension screening. This can be attributed to them being health conscious, knowing the repercussions of diabetes and hypertension and the need for them to take care of their health.

The fact that the respondent was in North Eastern, Central and Nairobi region increased the chances of screening for diabetes and hypertension by 1%, 1% and 6% respectively. However the fact that the respondent was found in Rift Valley, Western and Nyanza region reduced the chance for screening by 1%, 0.1%, 1% and 2% respectively.

CHAPTER FIVE

CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the study findings, and conclusions of the empirical findings in relation to the demand for hypertension and diabetes screening in Kenya. The chapter also gives policy relevance, recommendations, and the limitations of the study.

5.2 Summary and Conclusions

The study was undertaken in order to investigate the factors that influencing the demand for hypertension and diabetes screening in Kenya. It is based on several empirical studies relating to the demand for hypertension and diabetes screening in Kenya. The study used the cross section data from the Kenya Demographic and Household Survey (KDHS, 2014).The study found out that the likelihood for screening for hypertension and diabetes increased slightly as the age increased, education level improved, and as people engage in physical activities. However sex, wealth region were found to have a negative effect on the demand for hypertension and diabetes screening.

Kenya is one of the Sub-Saharan countries going through epidemiological transition from infectious diseases to non-infectious ones. The burden of hypertension and diabetes has increases exponentially leading to the emergence of major health problems. Diabetes and hypertension screening in Kenya still remains largely unmet which can be attributed to lack of prerequisite infrastructure to remedy and manage the conditions. A probit regression model was utilised to estimate the variables.

5.3 Policy Recommendations

A good healthcare system goes a long way in improving life expectancy and productivity of the workforce. Sustainable Development Goal (SDG) 3 aims to ensure healthy lives and promote the wellbeing of all ages. As part of human resource development the national government of Kenya needs to create and implement policies such as universal health coverage that facilitate and enable access to subsidize if not free screening for hypertension and diabetes. It also needs to invest in both human and physical infrastructure to ensure that Kenyans from all walks of life can access the screening services and attain the WHO recommended ratio of one doctor to a thousand people.

Many poor people are not able to access quality healthcare due to low income and lack of finances. It is very difficult and quite expensive to control or manage hypertension and diabetes. Most Kenyans who are diabetics are not in a position to readily access insulin and if they do the charges are exorbitant. To remedy this the government should formulate and implement policies that subsidize the cost of hypertension and diabetes medication. Medical supplies should also be availed in time to prevent deaths and complications resulting from lack of medical attention and treatment from people suffering from diabetes and hypertension.

The study found that many people who had a higher education level were less likely to screen for diabetes and hypertension. The government should increase investment in the education sector so that more Kenyans are able to learn and be made aware on the need for a healthcare or insurance cover. Education also plays a role as it enables people to make informed decisions about their health.

Many people who exercise a lot are conscious about their health. Such people are more likely to get screened for terminal illnesses such as diabetes and hypertension which are lifestyle diseases. To promote healthy living, the government should promote sustainable development whereby our

physical infrastructure includes sidewalks for morning and evening runs, schools should have create ample time for personal exercises for students. It should also create policies that facilitate the workforce to engage in physical activities often such as having a walk to work day once a week. Also most regions do not have the prerequisite infrastructure to screen for diabetes and hypertension. The government should fast track the rollout of machinery, equipment to health centres in rural areas. It should also create policies that facilitate and subside health education

5.4 Limitations of the Study.

Some of the variables had very few observations with many missing values. In addition to that some variables did not capture well what the study wanted to investigate as per the objectives. This made it a challenge to attain the objectives of the study. In addition to that the KDHS data was collected in 2014 so it may not reveal the true picture of the demand for hypertension and diabetes screening five years afterwards in 2019.

5.5 Suggestions for Further Research.

Prevention, treatment and care of hypertension and diabetes patients is a global phenomenon. In Kenya both terminal diseases are top on the list of the killer diseases. The prevention and control of non-communicable diseases (NCDs) such as hypertension and diabetes was identified as one of the priority issues in the Kenyan Government's National Medium Term Plan (2014-2018). Hypertension in particular is the most common of the cardiovascular diseases. It is fast becoming Kenya's largest health concern, accounting for over 50 % of hospital inpatient admissions and over 40 per cent of hospital deaths. The National Stepwise survey for Non-Communicable Diseases (NCDs), 2015 reported that one in four Kenyans is living with hypertension and more than half of the population has never had their blood pressure measured (Kavishe et al., 2015). Diabetes prevalence rate in Kenya stands at 3.3%, and is predicted to rise to 4.5% by 2025. Diabetes

accounts for 2% mortality in Kenya hence the need for preventive measures since it is a difficult disease to contain. However the infrastructure for screening both ailments vary across different regions, income levels and age in Kenya. The study .The study recommends further comparative studies in order to establish the demand for screening of diabetes and hypertension across different regions, income level and age.

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