

**THE ECONOMIC BURDEN OF NON-COMMUNICABLE DISEASES (NCDS) ON
HOUSEHOLD WELFARE IN KENYA.**

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REG NO: X53/6630/2017

**Research Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of
Masters of Science in health economics and policy in the School of Economics.**

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October, 2020

Declaration

I declare that this research proposal is my original work and has not been presented to any other institution for any other award.



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Dedication

I'd like to dedicate this project to all the people suffering either directly or indirectly from non-communicable diseases. I would also like to dedicate it to my family members for their never ending support.

Acknowledgements

My appreciation goes to my university Supervisor Dr. Martine Oleche for his continuous and constructive advice, academic guidance and encouragement towards accomplishment of my thesis. I also sincerely appreciate the efforts of all the lecturers who took me through the coursework. Lastly, to my family members for their continuous effort, support and encouragement during the development of this work.

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Abbreviations and Acronyms

AIDS	Acquired immunodeficiency Syndrome
CRD	Chronic Respiratory Diseases
CVD	Cardiovascular Diseases
GoK	Government of Kenya
HIV	Human Immunodeficiency Virus
KEMRI	Kenya Medical Research Institute
KNBS	Kenya National Bureau of Statistics
LMIC	Low and Middle Income Countries
MOH	Ministry of Health
NCDs	Non-communicable disease
NHIF	National Health Insurance Fund
OOP	Out of Pocket
SDG	Sustainable Development Goals
SSA	Sub Saharan Africa
UNICEF	United Nations International Children’s Emergency Fund
WHO	World Health Organization

Abstract

The main non-communicable diseases include: cardiovascular diseases, cancers, diabetes, chronic pulmonary diseases and mental health. The main objective of this study is to investigate the economic burden of non-communicable diseases on households in Kenya, with the specific objectives being to examine the profile, trends and prevalence of NCD's, to study the effect of NCD's on household welfare as measured by expenditure per capita and to suggest the various policy recommendations that reduce the disease burden of NCD's in the country.

The study utilized the latest Kenya household health expenditure and utilization survey- KHHEUS (2018). To model the hypothesized relationship, the study employed Ordinary Least Square (OLS) estimation technique to test the relationship between the independent and dependent variables. The diagnostic tests that were used included normality test, multicollinearity test and heteroscedacity test. Trends and patterns were purely descriptive and were analyzed as such.

From the findings of the study it was found that presence of NCDs and household size were believed to be positively associated with the household welfare while place of residence and working status influenced the house expenditure per capita negatively. Contrary to expectations, variables such as marital status, age in years, age square and years of education were found to be insignificant predictors in determining household welfare with regard to the economic burden of NCDs in households.

Out of pocket expenditure on treatment of non-communicable diseases is often a barrier when it comes to seeking care and services for this long-term conditions. They take a toll on a family's monetary resources and time, leading to financial impoverishment. From the study, it is clear that non-communicable diseases have a major poverty and economic impact on households. This indicates a need by the government for proper health financing to help deal with the burden of non-communicable diseases.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In the latter half of the 20th century, there was a lot of improvement in health care provision across the globe, according to a report written by WHO (2008). Thanks to the strides being undertaken in economic development, the incidence and mortality rates associated with communicable diseases and poor nutrition went down, Nguyen et al. (2011). Non-communicable diseases, which were initially not part of the millennium development goals, were steadily on the increase and it was impossible to ignore their growing contribution to not only preventable deaths, but also huge economic losses. This compelled governments and policy makers to initiate fast action to deal with the diseases.

There have been multiple epidemiological transitions seeing a rise in non-communicable diseases, and showing a marked decrease in the prevalence, morbidity and mortality arising from infectious diseases, according to the international burden of disease assessment (2016). In 2016, 54.7 million people lost their lives, 72.3% of those were from non-communicable diseases and 8.4% from neonatal, maternal, nutritional and communicable conditions. Mortality rates from NCDs have risen by 16.1% between the years 2006 to 2016 and have the potential to reach 52 million by 2030.

The public health impact of non-communicable diseases, and their devastating social and economic consequences, could not be ignored further and world leaders in September (2011), adopted a political declaration and committed to address the global burden of NCD's. Several assignments were given to the World Health Organization (WHO) to support various country's efforts in dealing with NCD's. The global NCD action plan 2013-2020 was developed as a result, with an aim of preventing and controlling the spread of non-communicable diseases. The plan included nine voluntary countries and a global monitoring framework. This was adopted and put into motion in 2013.

Chronic diseases have been described as diseases that last for a minimum of 12 months, and may cause functional limitations or on-going medical visits and services, and also include disability, Shi et al (2010) while Chuma et al (2007) described them as diseases that lasted over three months. According to Goudge et al (2009) described chronic ailments as those that persisted for more than a month and finally Mondal et al. (2015) considered chronic diseases to be conditions that lasted quite three weeks and needed long term management. In most cases non-communicable diseases are described as chronic ailments that prolong for long

durations and are caused by either genetic predisposition, physiological, behavioral or environmental factors. According to the National Library of Medication, non-communicable diseases are described as medical conditions that are both non-infectious and non-transmissible. The main non-communicable diseases are cancer, cardiovascular diseases, diabetes, chronic pulmonary diseases and mental health.

The human, social and economic consequences of non-communicable diseases are felt in most countries in the world. However, there are significant health and development challenges in various countries in terms of the suffering and the impoverishment they cause on the socio-economic fabric of the less fortunate in our societies. Lifestyle behaviors principally influence this. There are unit predictions that non-communicable diseases can still rise within the coming years, inflicting a minimum of nine million deaths annually among individuals aged below sixty years in Sub-Saharan Africa (Mbanya, 2010).

The 2010 global organization agency global analysis on non-communicable diseases revealed that they're currently the main reason for mortality worldwide. Non-communicable conditions were initially assumed to solely have an impact on high-income countries since they're mostly considered to be lifestyle diseases. NCD's account for amongst the highest mortality and morbidity rates in low and middle income countries, despite the lack of continuous surveillance data in most of these regions.

The incidence of non-communicable diseases, globally has been on a steady increase, resulting in The United Nations hosting two international conferences on health-related problems. The first meeting was held in 2001 on HIV/AIDS, and the Second High-ranking Meeting held by the United Nations was on the 66th General Assembly, held in September 2011 on non-communicable diseases. A global monitoring framework was then developed by WHO, with nine voluntary targets, aimed at reducing the global NCD mortality rate to 25% by 2025, leading to the adoption of the slogan "25 by 25" a target set to be achieved by the 2030 SDG framework. Surveillance data for non-communicable diseases is also critically needed to be able to inform interventions for the Global Action Plan for the Prevention and Control of NCDs.

There are various socio-economic and demographic factors like income level of household, age, place of residence, education amongst others that are associated either directly or indirectly with non-communicable diseases. Taking action on NCDs could not only potentially save millions of lives and economic productivity, but it would also, reduce the

cost of managing non-communicable diseases in Africa, which is high from managing pre-existing communicable diseases within the continent. However, this is expected to change on account of urbanization and lifestyle changes in developing countries of the globe.

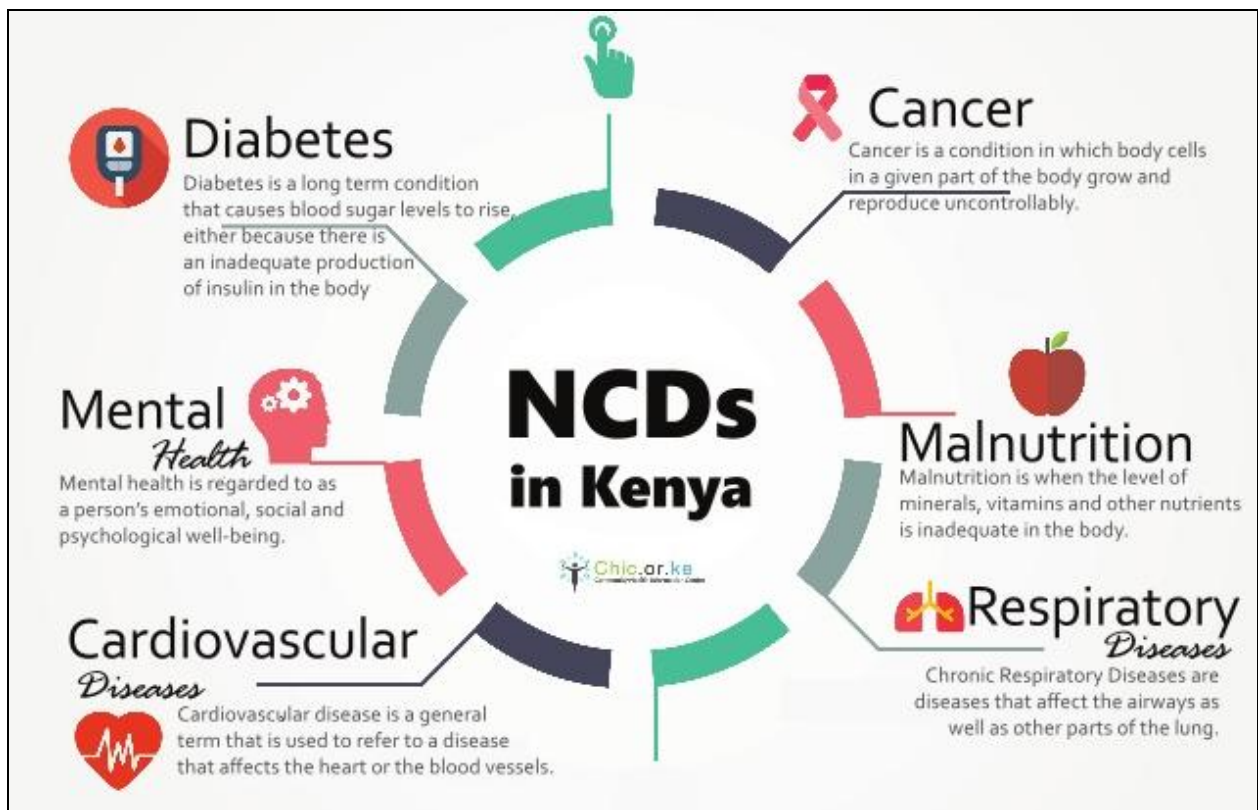
1.2 The Profiles of NCDs in Kenya

Kenya is a low-income economy with a sporadic economic process pattern. The major income earning sectors within the country include agriculture, tourism, and also the service industries. Records from independence to the present day, show that the population has grown almost fourfold what it had been during independence. This rise has placed a significant strain on the already limited health service resources, which haven't increased much from independence. The informal sectors in the country are characterized by low, irregular incomes, unsecure employment and self-employment with little or no social security, Xaba et al (2002).

In Kenya, approximately 46 percent of the population lives below the minimum wage line, with an estimated 31.6% is engaged in the informal sector while 26.3% of the labor pool is engaged in the formal sector, while the remaining 42.1% of the workforce is involved in subsistence farming and pastoralist activities (World Bank, 2010). As a result, half of the population lives in abject poverty and are incredibly liable to healthcare's impoverishing effects, particularly if they are suffering from non-communicable infections.

According to KEMRI, there are six most profound non-communicable diseases in Kenya (Figure 1). Cardiovascular disorders are the term that is given to any disease that affects the heart, heart's functionality and the blood vessels. Examples of the disorder include: congenital heart disease, pulmonary embolism, cardiomyopathy, Deep vein thrombosis, etc. other examples of NCDs include, cancer, malnutrition, diabetes, mental health, and respiratory diseases.

Figure 1: The Profile of NCDs in Kenya



Source: Non-Communicable Diseases | KEMRI, (2016).

1.2.1 Cardiovascular diseases

Cardiovascular diseases (CVD) are ailments affecting the heart and blood vessels. They include; cerebrovascular diseases, peripheral arterial disease, coronary heart disease, rheumatic heart disease, congenital heart disease, pulmonary embolism and deep vein thrombosis. Heart attacks could be caused by blockage in the arteries or veins of the heart, due to cholesterol or other substances that could cause a plaque or block in the coronary arteries. These plaques are also capable of rupturing resulting in internal bleeding and blood clots that block the arteries resulting in strokes.

1.2.2 chronic pulmonary (respiratory) diseases

Chronic respiratory diseases (CRDs) are diseases associated with the airways, or the lower respiratory tract which includes the larynx, trachea, bronchi and bronchioles and other structures of the lung like the alveolar ducts and sacs. The main hallmarks associated with CRD's are inflammation of the bronchioles and destruction of the lung parenchyma also known as emphysema, the consequence of either of these things happening is it results in airflow limitation. These diseases are incurable, and the disease can only be managed by seeking treatment or medication that dilates the airways and helps improve the shortness of

breath, helping to increase their health standards. Some of the most common respiratory ailments include; asthma, pulmonary hypertension, chronic obstructive pulmonary disease and occupational lung diseases.

1.2.3 Cancer (Malignant neoplasms)

A malignant neoplasms or cancers arise from an irregular masses of cells that grow abnormally and multiply more than they should. Neoplasms may be benign (not cancerous) or malignant (cancerous). Benign neoplasms may grow large but do not invade or expand to other surrounding tissues or body parts. Malignant neoplasms can advance into, or invade, surrounding body parts and tissues. They can also spread to other parts of the body through the lymphatic and circulatory systems. They can also be defined as tumors. The cells that form malignant neoplasms look less like the original normal cell. They have high proliferation rates compared to normal cells. Neoplasms that arise from epithelial cells are known as carcinomas while those arising from connective or mesenchymal tissues are known as sarcomas.

1.2.4 Diabetes

It is also known as diabetes mellitus, and it is a chronic disease, that is associated with high blood glucose that happens when the pancreas fails to generate enough insulin as required or when the body has trouble utilizing the insulin it produces.

Hyperglycemia, or raised blood sugar, occurs due to uncontrolled diabetes, with time it may cause irreversible damage to other body parts, particularly the blood vessels and nerves. There are two types of diabetes, type I, which requires the use of insulin and is also known as childhood onset diabetes and type II which does not require insulin shots and is also known as adult onset diabetes. Diabetes increases the risks of heart attacks, strokes and neuropathy in adults, long term effects may lead to blindness and limb amputation due to severe ulceration and nerve damage.

1.2.5 Other Non-Communicable Diseases

Mental health according to WHO (2009), is a comfortable state where individuals understand and realize their various abilities and are able to cope normally from various life related stress factors, be productive at work and make a positive contribution to their communities. From the above diagram, mental health is steadily on the increase as an upcoming non-communicable disease problem. Mental health disorders are made up of a wide array of problems, all with different signs and symptoms. The main identifying factors for mental health disorders are abnormal behaviors and thoughts, varying emotions and interactions with

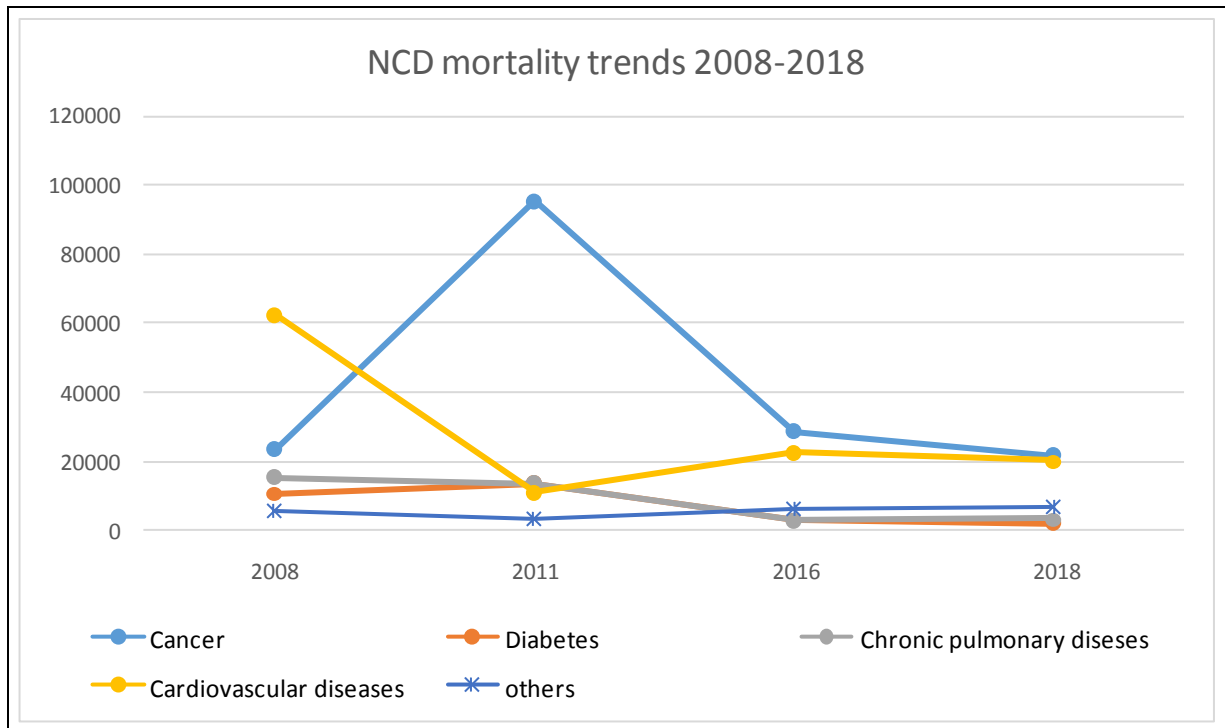
other people. Types of mental health disorders are: schizophrenia, depression, psychosis and bipolar disorders, intellectual disabilities and disorders which may arise from drug and substance abuse. Mental health is an integral determinant of overall physical health and socio-economic development.

Malnutrition has been a challenge in sub-Saharan Africa this is mostly due to the harsh climates and lack of sufficient rainfall in some parts, characterized by a mostly pastoralist way of life. Stunting – a major indicator for malnutrition- has been on an increase in Kenya, despite decreasing by almost a quarter in the rest of the world, according to a report shared by UNICEF in 2019. The report continues on to state that poor nutrition in-utero leads to children whose brains never develop to their full cognitive potential, leading to a disadvantageous start in their lives, and lowering their economic prospects in the long-term.

1.3 Trends and Prevalence of NCDs in Kenya

In 2018, the total number of cardiovascular diseases recorded in Kenya was 9791 in men and 10,143 in women, making the total count of recorded cases 19,934. Respiratory diseases (CPDs) recorded were 1569 for males and 1653 for females recording a total number of 3222 cases. Diabetes in males was 1116 while in females it was 661, making the total number of cases 1776. Cancer in males was at 10218 while in females was 11247, making the total number of cases 21465.

Figure 2: NCD Mortality Trends 2008-2018



Source: Source: Non-communicable disease mortality trends in Kenya. WHO, (2018)

From figure 2, it is clear that interventions that have been set up in the past decade to help deal with the rising incidence of non-communicable diseases have been working as mortality rates have almost plateaued. This could also be attributable to the uptake of social health insurance in the form of NHIF, which would help in paying for some treatment services. Educating the masses on various non-communicable diseases would also have a positive impact, leading to the decline of mortality cases associated with NCDs.

Foods that are rich in saturated fats and salts are unhealthy, particularly coupled with little or no physical exercise. Low incomes and poor nutrition to boot has been attributed to the rising cases of non-communicable diseases according to Albert et al (2005), while Elgoni et al (2008) linked high salt intake to the rising cases of cardiovascular diseases. Unwin et al (1999) stated that the increased uptake of tobacco and alcoholic products leads to increased blood pressure, which then increases the susceptibility to non-communicable diseases. The risk factors due to NCDs are genetic predisposition; behavioral risk factors like; unhealthy diet i.e. foods with high trans-fat and salt content, insufficient physical activity and exercise,

alcohol and tobacco use; disease co-infections; and Environmental factors like carcinogens, aflatoxins, asbestos, air pollution

With rapid urbanization, adoption of sedentary lifestyles, coupled with unhealthy foods, raised drug, alcohol and tobacco use and raised blood pressure, it was inevitable to see the burden of NCD's increase worldwide between 1990 and 2010 and Kenya has not been left behind. In a paper by Abegunde et al. (2007) he attributed the rise in NCDs prevalence to lack of exercise and exclusion of vegetables from diets. Smoking, alcohol consumption, unhealthy foods and lack of exercise are some of the main behavioral risk factors associated with NCD's.

The disease burden and mortality rates in Africa, WHO (2017) have increased from 22.8% (approximately 2.2 million) in 2002, to 34.2% (approximately 3.0 million) in 2016. It has been approximated that low and middle income countries make up 80% of global deaths due to non-communicable diseases. The high numbers could also be attributed to co-infections with other communicable diseases like HIV, which is prevalent in many African countries.

In a study by Mikaela Smit et al. (2019) it was estimated that half of Kenyan adults currently suffer from a type of NCD. The burden is averaged to be higher among people living with HIV than adults not living with HIV. Assuming current coverage of preventive and curative non-communicable disease services, prevalence rates of NCD's are set to continue rising in the next 20 years, particularly in people living with HIV. This increase will be attributed to rising population growth, the rapidly aging population and the change in lifestyle behaviors. Demographic growth will see more adults requiring care and services for non-communicable diseases, despite the prevalence rates remaining stable, by 2035.

In a paper by Edward Michieka et al (2018), there has been a rise in incidences of circulatory/heart diseases, hypertension and diabetes since 2008. According to the paper the marked increase in NCD's was coupled with an increase in per capita GDP and lack of sufficient exercise and an increase in processed foods. There is a definite correlation between dietary choices and lack of exercise, basically modifiable and lifestyle choices and the rapid increase in NCD prevalence rates in Kenya.

Sub-Saharan Africa (SSA) carries a considerable burden of major infectious diseases like HIV/AIDS, neglected tropical diseases, malaria and tuberculosis, the region also faces critical political, demographic and socio-economic transformations, epidemiological and due to the

harsh climatic conditions in some regions nutritional challenges. These challenges, coupled with the rising incidence rates of NCD's, could lead to catastrophic expenditure in health care which may eventually pose the next poverty trap.

Boutayeb et al (2005) argues that most NCD risk factors vary with the country. Some population characteristics like age, gender, education level, ethnicity and work status are also contributors to the burden NCD's cause according to UN agency (2002) Boutayeb (2005) went on to state that these risk factors account for approximately ninety to ninety-five percent of NCDs prevalence. Gupta et al. (2006) showed that all major non-communicable disease categories operate through shared common risk factors, as an example, various financial conditions predispose people to chronic non-communicable diseases (Hussain et al., 2005; Rugg, 2008).

1.4 Problem Statement

Non-communicable diseases have enormous economic consequences due to the combination of high healthcare costs and lost economic productivity arising due to missing work due to illness and premature deaths. As per the global incidence of disease study (2016), non-communicable diseases have accounted for approximately 72.3% or 39.5 million of all global deaths. In comparison, the total NCD deaths increased by 16.1% between the years 2006 and 2016.

In 2010, a study undertaken by the World Economic Forum, stated that between the years 2011 and 2030, the world would have sustained a cumulative economic loss of approximately \$47 trillion due to non-communicable diseases and mental illnesses. The study also stated that approximately \$30 trillion of this will be attributable to the four major NCD's; cardiovascular diseases, cancer, diabetes and chronic pulmonary diseases.

In the current times we live in, we have been affected by non-communicable conditions directly or indirectly. It was estimated by WHO in 2018 that non-communicable diseases lead to the deaths of 41 million people each year, which amounts to approximately 71% of total global mortalities. More than half of all non-communicable disease (NCD) deaths worldwide occur in LMIC's. These deaths, arising mainly from cancers, diabetes, cardiovascular and respiratory conditions, are attributable primarily to poverty, late detection of the chronic illness, and the high costs of treatment. Non-communicable diseases lead to catastrophic health expenditure especially amongst the poor and the uninsured.

The monthly costs of medication for most NCD's exceed several days wages for most people, in a study conducted in six countries by WHO (2018). When a cocktail of drugs and therapies are used, the expenses become unbearable, and these problems are escalated when more than one family member is ailing and requires treatment. Catastrophic expenditure happens when a household has to give up some basic needs like food, shelter, education or dispose of assets, seek loans or outside help or face impoverishment.

Like in many other African countries, Kenya has limited national resources, with a high population of its citizens living in abject poverty leading to a high disease burden. With most Kenyans being poor and vulnerable, the government, both county and national, needs to adopt policies that cater to this growing reality. Less than 10% of Kenyans can make any form of payment for any health service without incurring a financial burden. Any form of health insurance covers only about 6% of Kenyans. The means of financing for healthcare can be a significant barrier to accessing proper medical services.

To curb the daunting statistics surrounding non-communicable diseases, there have been various global interventions to reduce the prevalence of NCDs. These interventions could help ease the economic burden the conditions have placed on the people who suffer from them and the people who care for them. Catastrophic health expenditure occurs when it is more than 40% of a household's income after their basic needs are met.

The high rate of non-communicable diseases is attributed to the fact that there is a lack of proper awareness and knowledge of the various conditions, their impact, and control channels. The ministry of health, has not made controlling and preventing the spread of non-communicable diseases as emphasized in vision 2030.

A vast majority of households live on or below minimum wage. Such households are hit more by the impoverishing effects of non-communicable diseases and costs associated with their earnings and general well-being and would sink lower in the poverty scale.

Studies done on those who seek care when they are ailing, the costs of treatment and care show that non-communicable diseases emaciate the families' disposable income, leaving little for other basic necessities like food, clothing, appropriate housing and education. The prices of essential drugs used for managing non-communicable conditions account for at least half of out of pocket expenditure, and at least 25% of all hospitalized patients end up with high debts and are often more deficient. It is no wonder that with the advent of social media

that people turn to the various platforms to plead with netizens to donate towards helping kin ailing from multiple NCDs. Some strategies that are adopted to deal with the treatment costs of NCD's is to avoid seeking treatment at health facilities. They develop a "ignoring the disease" phenomenon coined by Sauerborn et al, (1996) by modifying the perception of the illness. This delaying treatment by the less fortunate in our society leads to higher costs of treatment as the severity of the disease has increased. Self-treatment is also another strategy often adopted to deal with these costs.

Non-communicable diseases affect patient's future productivity and emaciates a household's income and assets. Health expenditure on non-communicable diseases has immense economic losses and leads to household impoverishment.

The government should introduce policies to reduce the rising prevalence of non-communicable diseases. Policies in healthcare should also aim to protect such households from the impoverishing effects of high costs of health care and financial catastrophe.

1.5 Objectives of the Study

This paper's objective is to use household-level data to investigate the economic burden of non-communicable diseases on households' welfare in Kenya. The specific objectives:

- i. To examine the profile, trends and prevalence of NCD's in Kenya.
- ii. To study the effect of NCDs on household welfare as measured by expenditure per capita in Kenya.
- iii. To suggest various policy recommendations that reduces the disease burden of NCDs in Kenya.

1.6 Significance of the Study

Non-communicable diseases have been a major source of not only high mortality rates, but also immense economic losses. The results that will be acquired from this study, will be used to evaluate the economic burden of non-communicable diseases at household level here in Kenya.

The results will help bring knowledge to policy makers, so that they can better understand the effect non-communicable diseases have on households, and how to cushion households from the adverse economic effects arising from the same.

The results from this research will also help the government of Kenya and the ministry of health in its aim to lower the incidence rates of NCD's and to sought actions that will help in managing the devastating economic effects associated with coping with the disease.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Review

Health is a good that is consumed directly. People are generally happier when their health is in check. Health is also an investment. One demands good health so that they can work, and do a lot of the things that good health permits.

2.1.1 The Health Belief Model

"The health belief model" by Sheeran and Abraham (1996) was formulated to try and categorize the range of behaviors observed in seeking treatment. They categorized them as; preventive health seeking behaviors, sick role behaviors, and clinic use behavior. In this type of model, individual beliefs offer the link between socialization and behavior. Preventive health-related behavior patterns are as a result of different demographic attributes like gender, ethnicity, socio-economic status and age and lead to the choice of health service sought Rosenstock, (1974).

Health seeking behaviors are more or less attractive depending on various beliefs or ideologies.

This led to the development of an expectancy-value model of beliefs, where individuals positively or negatively evaluated various behavior relationships and which events are likely to arise from behavior relationships. There are various critical beliefs that lead to health-related behavior patterns, these could be ones genetic predisposition to a diseases, the benefits one hopes to get from a preventive behavior to ensure they don't contract the disease, the severity or consequences of the disease and the potential costs associated with managing and treating the disease.

There is a relationship between health related behavior patterns and health beliefs. These patterns can be used to tell apart those who have undertaken the said behaviors. This was initially only used for preventive disease but was later extended and included identification factors between health service use and sticking to health advice, Becker et al (1977). Hochbaum's (1958) studies on patient's uptake of tuberculosis X-ray screening was the basis of Rosenstock's (1974) initial health belief model.

If people knew they are genetically predisposed to suffer from a non-communicable disease, they would do more to avoid any risk factors associated with the disease. A study done by global medicine in 2016 found that NCD's are detected late here in Kenya due to a the lack of awareness on the disease coupled with the lack of proper disease detection centers, which

leads to high treatment costs and possible mortality since the disease has progressed to a point where the patient would need specialized care and treatment.

Health seeking behavior patterns are related to socio-economic status. Despite the amount of health education, socio-economic status and demographics cannot be changed, but other forms of health seeking behavior patterns can be modified and help in shifting health behavior patterns within the population.

Education is inversely related to non-communicable diseases and is another policy dimension that can be considered by governments in trying to curb the prevalence of non-communicable diseases. It is important to recognize that improved educational status of a country, has a positive improvement on the population's health status. Increasing the level of knowledge amongst the public, could potentially lower the households' risk of being susceptible to a non-communicable disease, particularly for those with genetic predispositions. In most African states, educational sectors receive more than the health sector, according to a study done by the Commission of macroeconomics and health, (2002). The Kenyan government needs to prioritize and budget for nation-wide campaigns to increase awareness and knowledge associated with various NCDs' risk factors, and work to promote and encourage the early detection of symptoms of non-communicable diseases to reduce mortality and any future economic costs.

2.1.2 Human Capital Theory

Human capital is directly related to the economic growth and development of a country. The theory has a both a planning and measurement utility. The value of one's current choices versus their long term returns and implications is measured using consumer economics, and helps with future financial planning. The human capital theory is used in shaping decisions on costs of any future opportunities against the opportunity cost of any current investments or situations. The theory also looks at the risks associated with human capital, assumptions on payback, the opportunity cost and also the illiquidity of it.

Education, medical services are determinants of human capital and is a means of production, Becker (1962). If the health stock is not replaced, the health stock depletes to zero, and finally results in death. Healthcare systems are increasingly becoming more complex, thereby impacting healthcare providers' ability to provide high-quality healthcare with a consequent decrease in demand for specialized care (Orayo, 2014).

Becker, the founder of the human capital theory, stresses that human capital increases productivity and wage rate; health only affects the number of days a person can work because

they are not sick. Health may affect one's annual salary, but not their hourly wage. Non-communicable diseases interfere with one's productivity at the work place. This happens whenever they lose work hours due to ill health, treatment and care. Household members who stay home to take care of their ailing kin also adds to the lost work hours arising from NCD's. The accumulation of the lost work hours by both the patient and the kin who are taking care of the sick greatly reduces the total human capital available for economic growth and development.

One can use the human capital approach to calculate the indirect cost of illness and evaluate the value of a human life. The value of a human life is a function of the person's income generated in their lifetime. Hence, the indirect costs can also be calculated as any lost work hours over a certain time frame arising from non-communicable diseases amongst the economically active.

Some non-communicable diseases are also called lifestyle diseases. Hence, individuals' lifestyles would directly affect the control of health production e.g., tobacco smoker versus non-smokers, alcohol drinkers versus non-alcoholics, over-tired people versus well-rested people, and normal-weight versus overweight people.

2.2 Empirical Literature

2.2.1. Measures of Household Welfare

Household welfare is measured using assets in the long-term and using current expenditures and incomes in the short-term. Expenditures on health measures the final consumption of health goods and services, which is the current health expenditure. It includes what is spent by both private and public entities on public health, medical goods and services as well as prevention programs and administration but does not include spending on investments.

In economic theory, households will widen their income generating activities when in uncertain situations or when their welfare is threatened. The household will then try to maximize its interests and amend the investment decisions carried out in the household. For example, if there is insecurity in land tenure, a household will determine how much investment can be done on the farm, Ellis (2000).

Welfare is often presumed to mean the happiness or fortunes of a person. It can also mean a social effort aimed at promoting the basic physical and possibly material wellness of a person, group or society.

The direct or indirect consumption of goods or services determines welfare. Various physiological aspects, environmental factors and preference determine consumption of goods and services and conversely welfare which is estimated by an integrated model of household consumption, outlined by Muellbauer, (1980). The main determinants of welfare at household level include; household composition, access to public services, goods and work and leisure at individual level.

A household's economic security is centered on wealth. Being wealth means affording a certain cushion against economic hardship, helping to pay for various services and large financial needs. The lack of assets by a household means reduced ease in making changes that may have longer term benefits like relocating closer to a health facility to help reduce the direct costs associated with transportation costs to health facilities. Where there are no assets to talk of, households rely on employment incomes, whether from formal or informal jobs or donations in forms of harambees or pleas on social media. Individuals who are in the lower wealth quintile scale, will not enjoy the same benefits afforded by those higher in the wealth quintile.

As per international standards more than half of the world's population is poor, with most of them concentrated in the third world countries of Africa, Asia and Latin America. Various studies conducted over time repeatedly show that all the poor have in terms of assets is often their labor, in whatever form. In most well-off countries most people earn a wage or salary that is paid off at the end of the week or month to employees that go to the same work place day after day, this is however not the case in LMIC's where this is an exception and not the norm, other forms or work arrangement are more popular.

People in third-world countries want and need secure and steady jobs that have good remuneration, offer substantial benefits like medical insurance covers for them and their families, meet the set labor standards, and offer social protections – otherwise referred to as “good jobs”.

One challenge is despite the qualified workforce, there are very few jobs available. Only about 10% of the population are in good jobs, the rest work mostly in the private sector through operating micro-enterprises mostly at household level, self-employment and casual jobs. Very few of them receive steady or regular wages.

Individuals tend to invest in themselves through education, training, and in keeping healthy and fit to increase their earnings. High-income earners will be able to invest more in their

individual health by spending more on medical goods and health promotional activities and diets to put of the effects associated with being susceptible to non-communicable diseases unlike their low-income earning counterparts. According to Arulampalam et al (2004), a sum of varying income sources collected over a certain time frame make up income at household level while wages only come from one source. Money received or collected on a regular basis makes up income, this could be from investments, regular employment, self-employment and social security pay-offs. It is hence considered to be an economic measure that aims at providing an estimation of an individual's actual purchasing power in an open market after accounting for inflation.

In this paper, we will use expenditure to determine household welfare. Expenditure per capita is the sum of public and private health expenditures as a ratio of the total population. In Kenya, agriculture, pastoralism and other informal activities are the dominant occupations in the country. Employment in agriculture and the informal sector seems to be a means for coping with poverty. Suffering that is associated with poverty in the rural and urban regions is mostly influenced by low wage and insecure employment in the informal sector, which is characterized by low, irregular and untaxed incomes with no social security, Xaba et al (2002). Poverty refers to the lack of necessities required in day to day use and for future developments. Poverty is not a new or unique phenomenon in Kenya it was highlighted as one of the main problems that needed prioritization when the country gained its independence in 1963 GOK (1965).

In Kenya, more than 46 percent of the population lives in abject poverty, with approximately 26.3% and 31.6% of the total working population being involved in either the formal or the informal sectors, respectively, while the rest 42.1% being involved in small-scale and mostly subsistence farming and pastoralist activities (World Bank, 2010). It is problematic to evaluate the exact incomes of informal sector workers to even plan out social health insurance that would help with dealing with the impoverishing effects of out of pocket expenditure on health care.

A proper health financing system raises funds required for healthcare, where the citizens can utilize the health services they require without having to pay out of pocket and are protected from financial catastrophe and impoverishment.

Out of pocket costs are regressive – the poor end up paying out a higher proportion of their household income to cater to health expenses, particularly those with non-communicable diseases and other long term chronic diseases. Which can in the long run result in catastrophic health expenditure. Healthcare spending is considered disastrous if it is high enough to disrupt the households' living standards significantly. Healthcare systems should be strengthened to be able to address the prevention, control and rising incidence of NCD's. This is done by understanding the social determinants and providing people-centered universal health coverage.

2.2.2. Profile Of Economic Burden

A development crisis characterizes third world countries since the 1970s. The low economic process mainly depicts this crisis, inadequate saving and investment ratios, payment deficits, declining income, high debt levels, and an over-reliance on foreign and international aid and handouts. All of those are attributed to varied factors, both internally and externally during a country. Total health expenditure is increasing faster than GDP and is on a gradual increase in LMIC's. There are more people, populations and communities who are currently adopting unhealthy lifestyles, according to Bonita et al (2001), which promotes the incidence rates of non-communicable diseases. The more households become more stable financially, the more they become increasingly exposed to NCDs.

Regardless of the disease, it is almost impossible to assess the direct costs incurred for treatment of non-communicable diseases by households without focusing on catastrophic healthcare expenditure and impoverishment. Catastrophic spending arising due to non-communicable diseases is explained as the amount of out of pocket expenditure that goes towards catering for non-communicable diseases at household level – which is the sum of household expenditure minus the expenditure for basic subsistence needs- once exceeding a given threshold level. Financial impoverishment occurs when a respondent would have had a net income above the poverty line in the absence of the expenditure on non-communicable disease, but below it after—I.e., the percentage of better off households falling into poverty due to direct costs associated with NCDs. Different poverty lines are used across different studies.

It is important to note that unregulated direct charges levied on health services lead to a significant access barrier to much-needed healthcare services, leading to atrocious out of pocket payments and generating problems of financial protection leading to catastrophic expenditure on healthcare. Out of pocket payments, particularly for treatment and

management of non-communicable diseases, can push households into poverty (impoverishment) and the primary solution is financial risk protection, through a prepayment health financing mechanism, for example; taxes or social health insurance. Out of pocket payment is the most basic form of financing in healthcare. This is where a fee is charged to patients to cover all or part of the cost of the service provided. This does not include prepayment in any form; this includes specific insurance contributions and taxes.

When it comes to household welfare, it is impossible to overlook the indirect costs associated with non-communicable diseases. Indirect costs are costs that arise due to the reduction or cessation of work productivity due to the morbidity and mortality associated with a certain disease. These costs mainly consist of loss of work, replacement of workers and reduced productivity caused by illness and disease. These types of economic losses are considered from a societal perspective, and individual's perspective or an employer's perspective.

An indirect cost of illness is the value of lost productivity, it also includes any income that may have been forgone due to unprecedented mortality and that lost by people who can't work due to the disease according Colditz, (1999). Mortality costs are the present value of any future earnings that will be lost due to premature death and the worker replacement that will occur as a result. Lost output consists of lost income, long-term work disability, home healthcare costs, lost leisure time, production loss to employers and self-enterprises, and the lost taxes cost to society. Caregivers, particularly family, to those ailing from NCD's efforts should be considered too when considering the indirect costs of the disease, due to their time contribution and any other in-kind services they may offer. These are intangible costs and should also be considered.

Other indirect costs include hospital consultation fees, medical examination fees, and costs of medication, lab tests and therapy according to WHO (2010). All other types of health-related expenses including transportation fees to health facilities should also be calculated as indirect costs, Ke Xu et al, (2003). The care required when patients are hospitalized due to NCD's, according to world health survey questionnaire, (2002), whether by doctors, nurses, midwives, traditional or alternative healers, dentists; medication or treatment aids, diagnostic and laboratory costs were some of the components of household costs measured.

A minimum of 21 million work productive years are lost by not only the patients, but also the patients family caregivers, in Sub-Saharan countries due to cardiovascular diseases, Gaziano

(2005). The time lost due to NCD's varies with disease type and severity that is chronic versus acute or depending on the stage, in terms of cancer and the patients ranking on the wealth quintile. Those whose diseases are more advanced miss more work leading to reduced employment efficiency and reduced human capital. Human capital is associated with the various characteristics (education and knowledge) that makes a worker more productive, with workers ailing from NCD's, this human capital is greatly reduced.

Patient related costs impact health-seeking behavior and consequently, the intervention outcomes. Patient-related costs are important because they help in deciding the delivery mechanism of a health program such as post-treatment care for those suffering from non-communicable diseases and seeking to understand the cost-burden of accessing services for treatment and care.

Many families stricken with chronic non-communicable diseases, especially those lower in the poverty line, may end up seeking home care to manage post-treatment costs. Very few people can afford home-based nurses; hence family members end up chipping in providing home care. It may be time to appreciate the work some people with no training in healthcare put in to take care of their kin who are suffering from NCDs. It may be time for the government to try and train them to help their kin better.

2.3 Overview of Literature

Health expenditure on non-communicable diseases has notable economic losses which may lead to household impoverishment in third world countries. In low and middle income countries, cost and affordability are the main issues that should be addressed when analyzing the burden of non-communicable diseases.

The human capital theory human capital is an important driver for economic development and growth and may directly affect economic development and growth or indirectly through technological progress through access to educational facilities. There is a noted relationship between the human capital theory and the economic burden of non-communicable diseases on households. With the Kenyan labor market being mainly influenced by weak generation of formal employment coupled by new jobs in low productivity sectors or locally known as *juakali* sectors, unemployment is on a record high. This means that if such households are affected by any form of non-communicable disease, they suffer the economic burden of seeking treatment and management of their ailments on a higher scale.

In the health belief model, if a person knows they are susceptible to contracting an NCD, maybe due to genetic predisposition, they would change their health behaviors, influenced by their beliefs and any perceived benefits they would hope to reap from the behavior change that would reduce the disease threat. Seeing as the main components making up the health belief model include; the desire not to fall sick or to try and regain good health if one is already sick and the belief that undertaking certain health related actions will cure or prevent the disease. This means there is a significant relationship between the health belief model and the economic burden of non-communicable diseases, since one is generally predisposed to contracting the diseases either through genetics or environmental factors, anyone with any knowledge on the disease would do what they can, in terms of health actions to avoid the disease. This is why education, as mentioned in the human capital model is important in helping deal with the economic burden non-communicable diseases have over households.

In Kenya, treatment and care services for non-communicable diseases are provided in both the public and private sectors, however the costs paid out for the services vary substantially, the type of care and therapy would also be different as would be the time spent at the facility for treatment. The low rate of healthcare insurance coverage (due to the majority being in informal jobs without steady wages and incomes) and the high costs of many NCD treatment and services may result in healthcare disparities. Lower households are more likely to suffer from catastrophic health expenditures compared to wealthier families, and hence the gap between the haves and have-nots is expected to increase as the non-communicable disease burden increases.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

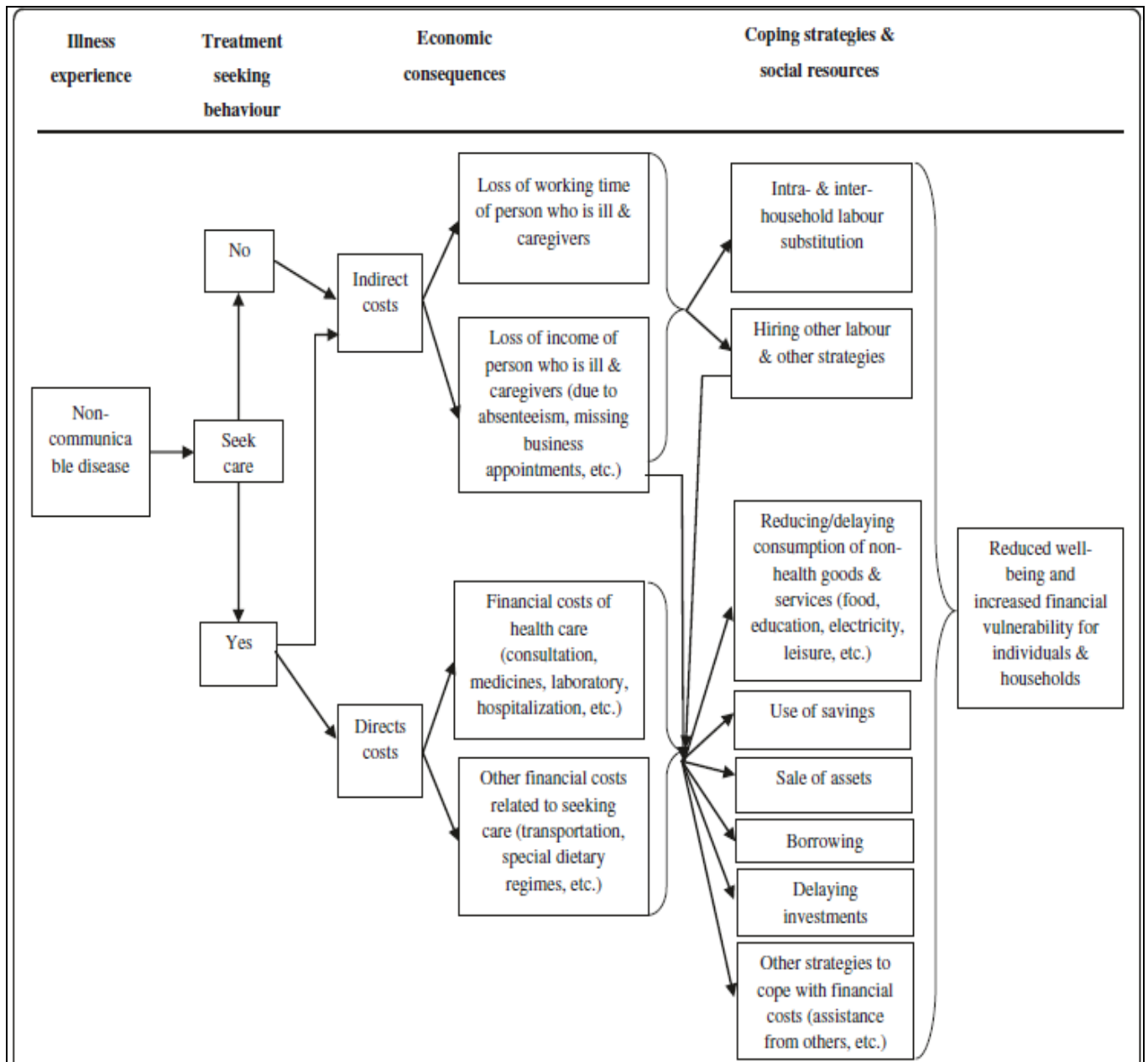
The study has employed a descriptive cross-sectional research design. The approach of a cross-sectional study design has allowed for information about the target population to be obtained at a certain point in time. In contrast, the descriptive design has also allowed for the collection of data that has provided answers on the current status of the parameters of measurement used. This research design was deemed suitable as it allowed for the complete exploration of the necessary information regarding the study's objectives and also enabled the coverage of the target population to allow for generalization of the information that was collected.

3.2 Theoretical and Conceptual Framework

When considering the impact non-communicable diseases have on household welfare, it was important to calculate the costs of treatment and care and the costs of losing work hours, not only for the patient but also for the kin staying home to attend to the sick. Non-communicable diseases end up posing a hefty financial burden on many affected households with the brunt of it being on poorer households when they seek care or treatment.

Medication takes up the largest component of costs for example; insulin for diabetics and chemotherapy for cancer patients. These high costs end up stopping anyone who are suffering from seeking much needed care. This is why financial risk protection in LMIC's is important. The theoretical framework used for analysis of the economic impact of non-communicable diseases on households was adopted from McIntyre et al. (2005) as indicated in Figure 3.

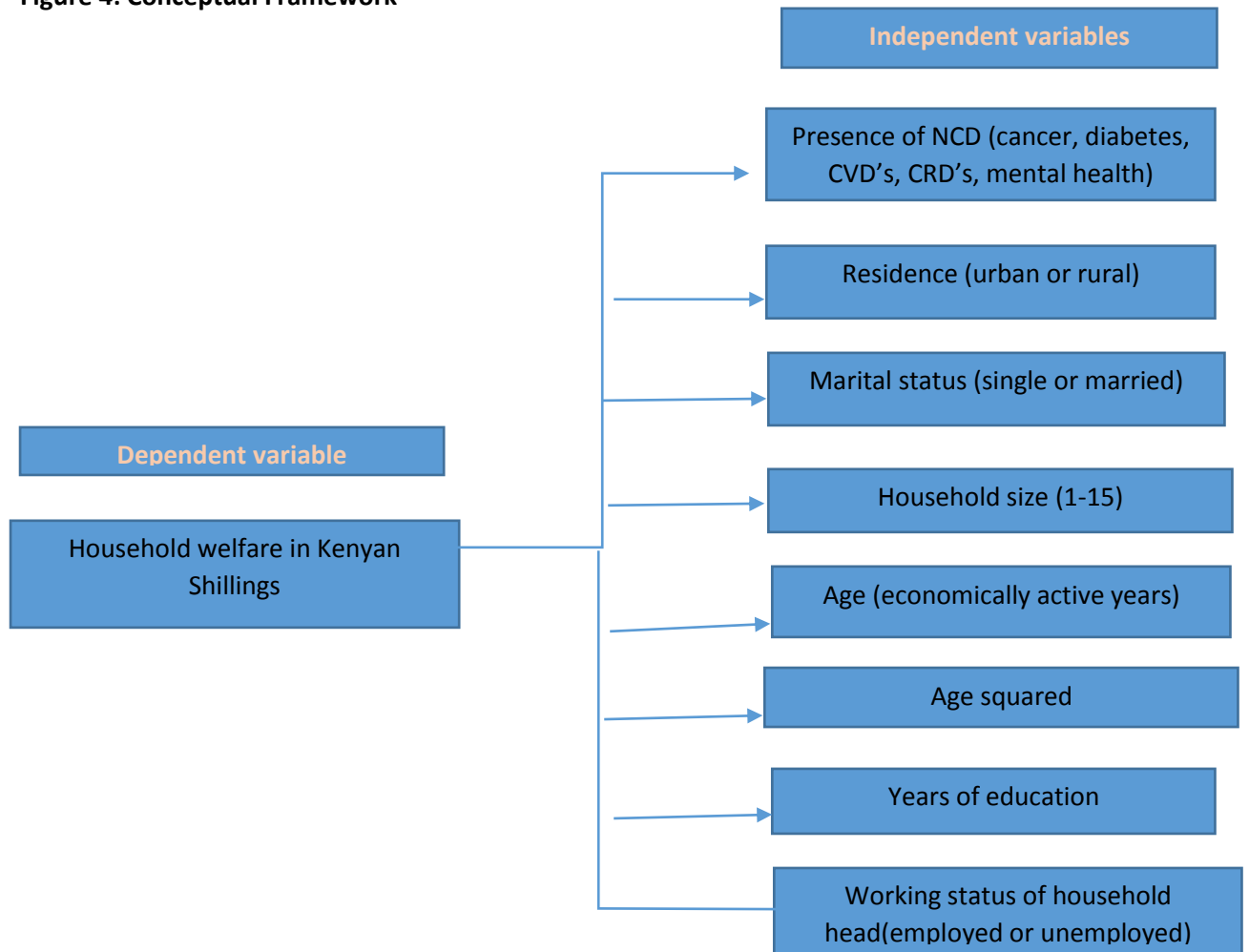
Figure 3: Framework for analysis of the economic impact of non-communicable diseases



Source: McIntyre et al. (2005)

Following the Theoretical Framework, the conceptual frame work was derived as indicated in Figure 4.

Figure 4: Conceptual Framework



Source: Authors own construction from McIntyre et al. (2005) theoretical framework

3.3 Empirical Model Specification

The analytical framework followed Mwai and Muriithi (2016: 84) restatement of the household utility framework that was developed by Becker (1962). According to the household model of consumer behaviour, it was assumed that households maximize a price independent function which was related to a family's budget and within its set spending restrictions. Often, the choices of items utilized in a household are determined by the household head, who is the main decision maker for the household, or alternatively item choice was determined jointly, with the assumption that household members enjoy the same

$HWel$ = Household Welfare (HWel)

ncd = Presence of Non Communicable Diseases (NCD)

R = Place of residence(R)

M = Marital status

HS =Household Size

A = Age

AS = Age Squared

E = Level of Education achieved

O = Occupation of the household head

ε = Error term

$\delta_1, \dots, \delta_8$ = slope coefficients for each explanatory variable

δ_0 = intercept (constant term)

The descriptions, measurements and the expected signs of the variables are indicated in Table 1

Table 1: Descriptions and Measurements of variables used in the model

Variables	Measurement	Expected signs
Dependent Variable		
Household Welfare(HWel)	Measured in expenditure per capita Household Income in Kenya Shillings	
Independent variables		
Presence of Non Communicable Diseases- <i>NCD</i>	This is a dummy variable indicating 1=Presence of (ncd) either CVD, CRD, cancer, diabetes or mental health 0-Otherwise	Positive
Place of residence(R)	This is dummy variable indicating 1=Rural residence	Positive Adebayo et al.

	0=urban residence	(2015) Masengeli et al. (2017)
Marital status(M)	This is a dummy variable indicating head of household married = 1 Single = 0	Positive
Household size (HS)	This is a continuous variable measured by the number of individuals in a household.	Positive / negative
Age(A)	This is a continuous variable measured by the age of the economically active members in year's household measured in years.	Positive/Negative Boateng & Awunyo-Vitor (2013) Adebayo et al., (2015),
Age squared(AS)	This a dummy variable measuring the square of the age of the household measured in years	Positive/Negative Nketiah-Amponsah & Hiemenz (2009) Alesane & Anang (2018)
Years of Education achieved(E)	This is a continuous variable Number of years in school	Positive Mhere (20103) Maina, Kithuka & Tororei (2016)
Working status of the household head(O)	A dummy variable indicating Household head Employed = 1 Household head is Unemployed = 0	Positive Sanusi & Awe (2009) Masengeli et al., 2017

Source: Authors own construction

3.4 Diagnostic Tests

3.4.1 Normality test

The scientific literature was bound to have at least one statistical error. In statistics, most parametric tests which include correlation, t-tests, regression tests and analysis of variances infer that scientific data that is collected will follow a normal distribution curve. This normality assumption is necessary when putting up confidence intervals for test variables.

It is necessary for inferences on normality to be taken seriously as it is hard to make proper conclusions on reality if these assumptions are incorrect. Normality is tested visually by the use of normal plots or alternatively by putting up significance tests that compare the sample distribution being tested to normal sample distributions.

3.4.2 Multicollinearity

Collinearity means there is a relation between two explanatory variables for different reasons, including model specification and the population being sampled. Multicollinearity occurs in multiple regression models where there are either two or more descriptive variables that are linearly connected. As a result of this connection, the statistical power in the regression model is weakened leading to misinterpretation of the data.

The Variation Inflation Factor will detect multicollinearity, and the value of the factor should be below 10 for the perfect regression.

3.4.3 Heteroscedasticity

Heteroscedasticity means unequal scatter that the variances of the error terms are not constant varying from one observation to another. This can be due to different factors, including incorrect model specification and outliers leading to wrong estimated Standard Error. This situation will result in linear, unbiased, but inefficient Ordinary Least Square (OLS) and unreliable Confidence interval (CI). Hetttest will be used to test for Heteroscedasticity.

3.5 Data type and source

The study utilized secondary data from the Kenya Household Expenditure and Utilization Survey (2018). This cross-sectional survey collected information on households' characteristics and the economic burden brought about by non-communicable diseases.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.0 Introduction

The study's goal was to determine the impact of non-communicable diseases (cardiovascular diseases, chronic respiratory ailments, diabetes, cancers and mental health) on Kenyan households. In this regard, the demographic profiles of family units under investigations are as tabulated;

4.1 Descriptive Statistics

The descriptive statistics considered in this study include average, standard deviation, minimum and maximum values. The mean shows the average value for each variable whereas the standard deviation shows variations from the mean. The survey captured data of 30605 individuals. The variables of concern were type of residence, age, marital status, education level, working status, household size, presence of NCDs and household wealth index.

Table 2: Summary of Demographic Statistics

	N	Mean	Standard deviation	Minimum	Maximum
Household welfare <i>H/Wel</i>	30605	2052.45	30385.65	2	1550000
Presence of Non communicable disease (<i>NCDs</i>)	30605	0.151	0.358	0	1
Place of residence <i>R</i>	30605	0.626	0.484	0	1
Marital status <i>M</i>	30605	0.699	0.459	0	1
Household size <i>HS</i>	30605	4.438	2.503	1	30
Age <i>A</i>	30605	46.689	16.055	17	98
Age squared <i>AS</i>	30605	2437.675	1672.712	289	9604
Years of education achieved <i>E</i>	30605	7.157	4.920	0	21

Working status of household head <i>O</i>	30605	0.696	0.460	0	1
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Source: Authors own, from data set.

The analysis showed that the rural household dwellers accounted for 19160 (62.6%) and the proportion of families with presence of NCDs was 15.1%. Sixty nine percent of household heads were married and the mean household size was 4 with a high of 30. The mean age of household heads was 46 years with the youngest being 17 years while the average years of education was 7.156 with the highest being 21 Sixty nine percent of household heads were working.

4.2 Profile and Prevalence of NCDs in Kenya

In the first objective, the study wished to examine the demographic profile, trends and prevalence of NCD's in Kenya. In view of this, the results in Table 4.2 reflects the households that were affected by NCDs only.

Table 3: Summary of Bivariate Analysis on NCDs

	N	Mean	Standard deviation	Minimum	Maximum
Outpatient expenses	1,118	3,129.15	1,5077.87	30	400,000
No. of outpatient visits	1,118	15.92	7.24	13	52
Inpatient expenses	352	35,415.86	9,3320.09	1,500	1,500,000
Number of admissions – inpatient	352	1.09	0.29	1	2
Place of residence (R)	4,615	0.63	0.48	0	1
Age (A)	4,615	56.1	16.8	18	96
Age squared (AS)	4,615	3,429.88	1,912.51	169	9,216

Marital status (M)	4,615	0.58	0.49	0	1
Working status of household head (O)	4,615	0.67	0.47	0	1

Source: authors own, from data set.

The analysis revealed that 4615 households had incidences of NCDs, with majority of them being in the rural settings (63%). The mean age of household head affected was 56.1 years with a low of 18 years. The mean marital status and working status were 0.58 and 0.67, indicating 58% and 67% were married and working respectively.

The results also show that 1118 households made an average of 15 outpatient visits in a year. The mean of the outpatient expenses was Ksh3129, with a maximum of Ksh400, 000. The number of households that sought in-patient treatment was 352. The mean number of inpatient visits was 1.09 with a maximum of 2. The average cost of inpatient services was Ksh35, 415.

4.3 Multivariate Analysis

In the second objective, the study wished to study the effect of NCDs on household welfare as measured by expenditure per capita in Kenya. To achieve this, an OLS regression model was used.

4.3.1 Multicollinearity Analysis

Before the variables were included in the regression analysis, the investigator performed collinearity diagnostics to identify possible inter-correlations between independent variables, as well as between moderating variables, with significant effects on the accuracy of regression model in explaining household welfare. Multicollinearity is realized when a linear relationship between independent variables exist and as such will inflate the variance of one of the regression coefficients. Collinearity is indicated by **VIF>10** and a **Tolerance value> 1.0**. In view of this, the analysis revealed that the variables of age and age square displayed collinearity effect (Age; VIF=36.316, Tolerance=0.028; age square; VIF=36.810, tolerance=0.027). The other remaining independent variables however, did not show any collinearity. In this case, the two affected variables were dropped from the regression model.

Table 4: Multicollinearity analysis

Model	Collinearity analysis	
	Tolerance	VIF
Presence of NCDS		
Place of residence R	0.930	1.075
Marital status M	0.893	1.120
Household size HS	0.822	1.216
Age in years A	0.762	1.313
Age squared AS	0.029	34.961
Years of education E	0.028	35.438
Working status	0.744	1.344

Source: authors own, from data set.

4.3.3 Tests for Heteroscedasticity

The Breusch Pagan test was the test used for testing the existence of heteroscedasticity. The testing of hypotheses was involved in order to determine the existence of heteroscedasticity. The diagnostic test indicated that heteroscedasticity was present. In the Breusch pagan test, the p-value of less than 0.05 contributed to the failure to reject the null of homoscedasticity. The outcomes are as depicted in table 4.4.

Table 5: Breusch Pagan test for Heteroscedasticity

Variables: fitted values of Natural Logarithm of health Expenditure	
Chi2 (1)	3247.719
Prob>chi2	0.0000
<i>Ho: Constant variance</i>	

Source: authors own, from data set.

Since model estimation with no constant variance leads to uncertain estimates, robust standard errors were used in the study to correct the problem.

4.3.4 Normality Test

The Shapiro Wilk analysis was performed in the sample, where the p value for residuals was less than 0.05, meaning that the data was not normally distributed (see table 4.5). The research adopted a nonlinear model in view of the non-normality of data, where the dependent variable was transformed into a natural logarithm and the estimation continued.

Table 6: Shapiro Wilk Normality Test

Variable	observations	statistics	df	Prob>z
Residuals	30606	0.043	3866	0.00000
<i>Ho: Data is normally distributed</i>				

Source: authors own, from data set.

4.3.5 Discussion of Regression Results for Determinants of Household Welfare in Kenya

For assessment of overall fit of model, the R-squared statistic and F test were used. The value of R-squared of 0.006341 shows that the model explains about 6.34% of the variation in household welfare in the non-linear model and the p value of 0.0000 which is less than 0.05 meaning that the regression coefficients are not simultaneously equal to zero. This implies that variables used in the model explained the dependent variable significantly. Table 4.6 shows regression results.

The results of the regression model was interpreted in terms of the strength of the relationship thus revealing the significance of predictor variables in the response variable. The results show that out of the six predictor variables, four (presence of NCDs, place of residence, household size and working status of the head) variable were vital in determining either positively or negatively, the welfare of the household with regard to non-communicable diseases.

The analysis show that the non-communicable diseases in the family caused the biggest positive and significant effect on household welfare status, ($\beta = 0.033$, $t = 7.731$, $p\text{-value}=0.000$) indicating that NCDs impacts families welfare in terms of costs.

Table 7: Multiple Regression Model of standardized coefficients

Variable	Coefficient Beta (β)	Standard error	t-value	p-value	95% CI for β
Constant-C	-	0.13	210.329	0.0000	2.639 – 2.688
Presence of NCDs	0.046	0.004	7.731	0.000	0.024 – 0.041
Place of residence	-0.042	0.003	-7.047	0.000	-0.029 - -0.016
Marital status	0.011	0.004	1.789	0.074	-0.001 – 0.013
Household size	0.023	0.001	3.467	0.001	0.001 – 0.004
Age in years	0.047	0.001	1.386	0.166	0.000 – 0.002
Age squared	-0.006	0.000	-0.166	0.868	0.000 – 0.000
Years of education	0.001	0.000	0.120	0.905	-0.001 – 0.001
Working status of household head	-0.015	0.003	-2.396	0.017	-0.015 - -0.001
$R^2 = 0.006341$ T value = 7.731 P value = 0.0000					

Source: authors own, from data set.

From the regression results; presence of NCDs, place of residence, household size and working status of the household head were found to be statistically significant at 5% in affecting the expenditure per capita of households in Kenya. Presence of NCDs and household size were believed to be positively associated with the household welfare while place of residence and working status influenced the house expenditure per capita negatively. Contrary to expectations, variables such as marital status, age in years, age square and years

of education were found to be insignificant predictors in determining household welfare with regard to the economic burden of NCDs in households.

From the OLS model, the constant value was 2.664 meaning that holding all determinants constant, health expenditures per capita rose significantly at percentage level by 266.4%.

If the presence of NCD's increases by one unit, it positively affects the economic welfare of the household by 0.046 units, assuming that all other factors remain constant. The t-value is 7.731 which is greater than 2 and hence the presence of NCD's is a significant determinant of the household welfare. The p-value is 0.000 which is less than 0.05 and hence confirms the presence of NCD's has a significant effect on household welfare. The analysis show that the non-communicable diseases in the household caused the biggest positive and significant effect on household welfare status, ($\beta = 0.046$, $t = 7.731$, $p\text{-value}=0.000$) indicating that NCDs impacts families welfare in terms of health expenditure per capita. This indicates that having a NCD in the household at 5% level will significantly increase the health expenditure per capita by 4.6%. These findings match Mwai and Muriithi's (2016) paper on non-communicable diseases.

Place of residence negatively the welfare of the household decreases by 0,042 units assuming all other factors remain constant. The t-value is -7.047, is less than 2 and hence the place of residence is a not significant determinant of household welfare. The p-value is 0.000 which is less than 0.05 and hence confirms that the place of residence of a household has a negative effect on a household's economic welfare. Place of residence caused a negative effect on family health expenditure per capita ($\beta = -0.042$, $t = -7.047$, $p\text{-value}=0.000$) meaning that rural households were spending less by 4.2% in health expenditure per capita. This result is contrary to Daniel Mwai et al, (2016).

Marital status has a positive significant effect on household welfare, where if it increases by one unit, it affects the economic welfare by 0.011. The t-value is 1.789 which is less than 2, and hence marital status is not a significant determinant of household welfare. The p-value is 0.074 which is greater than 0.05 confirming that marital status is not a significant determinant of household welfare. Marital status was statistically insignificant in affecting household expenditures per capita ($\beta=0.011$, $t=1.789$, $\text{sig}=0.074$). Contrary to some papers like Brummet et al, (2011), marital status is not a significant determinant of household welfare.

If household size increases by one unit it increases the economic welfare by 0.023 units assuming that all other factors remain constant. The t-value is 3.467 which is greater than 2 and hence the household size is a significant determinant of household welfare. The p-value is 0.001 which is less than 0.05 confirming that household size is a significant determinant of household welfare. The size of the household significantly increased the health expenditure per capita by 2.3%, ($\beta = 0.023$, $t = 3.467$, $p=0.001$), indicating that larger families were likely to spend more in managing NCDs thus affecting the household welfare. These findings match Datta et al, (2018).

Age in years is significant in that if it increases by one unit it increases the economic welfare by 0.047 assuming that all other factors remain constant. The t-value is 1.386 which is less than 2 and hence the age of the household head is not a significant determinant of household welfare. The p-value is 0.166 is greater than 0.05 and confirms that the age of the household head is not significant to household welfare. Age and age squared were both shown to be statistically non-significant ($\beta=0.047$, $t=1.386$, $sig=0.166$ and $B=-0.006$, $t=-0.166$, $sig=0.868$, respectively) to household welfare. The age of the household head does not significantly affect the economic welfare of a household, these findings match Datta et al, (2018).

If the years of education achieved increases by one unit it increases the economic welfare by 0.001 assuming that all other factors remain constant. The t-value is 0.120 which is less than 2 meaning that the years of education achieved by the household head is not significant to household welfare. The p-value is 0.905 which is greater than 0.05 confirming that the years of education of the household head is not a significant determinant of household welfare. The years of education of household heads was also statistically insignificant in influencing household welfare concerning burden of NCDs ($\beta= 0.001$, $t= 0.120$, $sig= 0.905$).

This is contrary to Daniel Mwai et al, (2016) paper that suggested that education has an inverse relationship with NCD's.

If the working status of household head increases by one unit, the household welfare decreases by -0.015 assuming that all other factors remain constant. The t-value is -2.396 is greater than 2 and hence the working status of the household head is negatively significant to household welfare. The p-value is 0.017 less than 0.05 confirming that the working status of the household head is not significant in determining household welfare. The working status of the head of family also caused a negative significant effect on the household welfare status

($\beta = -0.015$, $t = -2.396$, $p = 0.017$), which suggest that the variable's effect is negative and statistically significant in terms of health expenditure per capita. This contradicts the Kankeu et al, (2013).

CHAPTER FIVE: CONCLUSION AND POLICY RECOMMENDATION

5.1 Introduction

This chapter summarizes the findings of the study and thereafter, conclusions are arrived at based on the established relationship between identified non-communicable diseases and economic burden on households in Kenya. Later policy recommendations and areas of further research are suggested as a way of filling the gap.

5.2 Summary of the study findings

Proper financial planning coupled with universal health coverage is essential in preventing catastrophic health expenditure. In spite of all these changes, people suffering from non-communicable diseases still end up paying very high costs for treatment out of pocket, as a result this ends up increasing the prevalence of NCD's.

The study was conducted with the sole aim of establishing the economic burden of non-communicable diseases on households in Kenya. The specific objectives were: to examine the profile, trends and prevalence of NCD's in Kenya; to study the effect of NCDs on household welfare as measured by expenditure per capita in Kenya and to suggest various policy recommendations that reduces the disease burden of NCDs in Kenya. The study made use of the latest KHHEUS (2018) dataset.

To model the hypothesized relationship, the study employed Ordinary Least Square (OLS) estimation technique to test the relationship between the independent and dependent variables. The diagnostic tests that were used included normality test, multicollinearity test and heteroscedacity test. Trends and patterns were purely descriptive and were analyzed as such.

From the estimation models used, there was no relationship between the area of residence and economic burden of NCD's. However there was a significant relationship between marital status of the household head, age, education and employment status, with education and employment having a negative relation with economic burden of NCD's.

5.3 Conclusions

From the findings of the study it was found that presence of NCDs and household size were believed to be positively associated with the household welfare while place of residence and working status influenced the house expenditure per capita negatively. Contrary to expectations, variables such as marital status, age in years, age square and years of education were found to be insignificant predictors in determining household welfare with regard to the economic burden of NCDs in households.

From the study it was revealed that most of the direct costs associated with non-communicable diseases were due to costs of essential medication. Health promotion and early detection and treatment would help reduce some of the costs associated with non-communicable diseases. Out of pocket expenditure on treatment of non-communicable diseases is often a barrier when it comes to seeking care and services for this long-term conditions. They take a toll on a family's monetary resources and time, leading to financial impoverishment. From the study, it is clear that that non-communicable diseases have a major poverty and economic impact on households.

5.4 Policy Recommendations

The presence of NCD's positively impacts a household's economic welfare due to catastrophic expenditure associated with the same. The government can work on reducing this through a health financing plan through proper dissemination of NHIF, to make it accessible for all, and to ensure that treatment and care for NCD's can be accessed by use of the same, in both public and private health facilities. Kenya has a mandatory social health insurance plan for those working in the formal sector – NHIF (National hospital insurance fund) those who are employed in the informal sectors are allowed to join voluntarily. NHIF services have been slowly rolled out within the country, and only recently started accepting patients on an out-patient basis in select hospitals. NHIF services should also include a benefit package for non-communicable diseases to be able to reduce the costs associated with care and treatment for those ailing. It is also important to prioritize and move towards more progressive financing mechanisms that offer financial risk protection for those in lower social classes to prevent impoverishment arising from diseases. Non-communicable diseases are the main cause of catastrophic healthcare expenditure here in Kenya. There is very little financial risk protection for households, which when coupled with unregulated direct charges levied on

health services then leads to a major access barrier to much needed treatment and care services for NCD's, consequently leading to atrocious out of pocket payments and generating problems of financial protection leading to catastrophic expenditure on healthcare which are subsequently borne by households rather than by the government or social health insurance schemes, as is the case in first world countries.

From the findings it was found that household size also significantly affects the economic welfare of a household. This is especially true when more than one family member suffers from non-communicable diseases. The government could work on ensuring social health insurance coverage is able to offer and provide coverage for the whole family if the parents are insured. The government can also work on introducing a health insurance plan that covers high school and campus students who may not be covered by their parents health insurance plans because they are older than 18, but also cannot afford to pay for their own insurance premiums.

The place of residence of a household had a negative relationship with the economic burden of households, with those in the rural areas spending less on treatment and care of NCD's. With the devolution of healthcare, it would be advisable for the government to ensure the proper distribution of health facilities within the various counties. The people in rural areas also possibly spend less on treatment due to more affordable healthcare facilities away from urban regions, which mainly consist of private healthcare facilities that could end up hiking the amount of money spent on healthcare in the urban regions. The people in rural areas could also use traditional forms of medicine which could lower the treatment costs. The government could work on integrating cheaper and alternative forms of treatment in urban areas.

The working status of the household head had a negative relationship with economic welfare which could be attributable to the fact that those who make more money are able to take care of themselves better and avoid NCD's. It would be important for the government to promote healthier lifestyles by making it cheaper to seek early detection of these ailments. The government can also promote health behaviors by introducing parks and recreational areas that are free to the public to allow people to exercise and keep fit and allow for healthier lifestyles.

5.5 Areas for Further Studies

The study has mainly focused on establishing the economic burden of non-communicable diseases on households in Kenya. It was limited to the coping strategies households use to cope with the burden. It was also limited on focusing on social health insurance as well as other forms of insurance uptake that could help with evaluating economic burden. Also with the devolvement of the health sector, it would be important to see how various counties are helping their people deal with chronic diseases and their economic burden. More studies need to be conducted using the sociocultural factors, infrastructural development among other factors.

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