DETERMINANTS OF NON-COMMUNICABLE DISEASES IN KENYA: THE CASE OF HYPERTENSION AMONG THE MILLENNIALS.

BY

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OCTOBER, 2019

Declaration

Student's Declaration

This project is my original work and has not been presented for a degree in any other university.

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Dr. PERIS WAMBUI KAGOTHO

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Supervisor(s) Declaration

This project has been submitted for approval, with my approval as the University supervisor.

Signature _____ Date: _____

Dr. MARTINE OLECHE.

Dedication

I dedicate this project report to my husband, John, whose immense support, words of encouragement and push for perseverance and tenacity ring in my ears, and to my daughters Amani and Taina for the motivation and encouragement I draw from them. All of you have been my best cheerleaders.

Acknowledgement

First, I acknowledge and wish to convey my sincere gratitude to God Almighty He has been the source of my wisdom, strength throughout this program and on His wings only have I soared. my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding.

I would like to specially acknowledge and appreciate the persons below who made my project work successful and closely assisted me to attain my goal:

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List of Abbreviations

BMI	Body Mass Index
BP	Blood pressure
CSDH	Commission on social determinants of health
CT	Computed tomography
CVD	Cardiovascular vascular disease
DALYs	Disability-Adjusted Life Years
DM	Diabetes Mellitus
D.O.P.C	Diabetic outpatient clinic
OSDC	One Stop Diabetic Clinic
CHW	Community Healthcare Worker
HTN	Hypertension
KDHS	Kenya demographic Health survey
MOPC	Medical Outpatient Clinic
NCDs	Non-communicable diseases
SDH	Social determinants of health
SSA	Sub-Saharan Africa
WHA	World Health Assembly
WHO	World Health Organization
WHR	Waist Hip Ratio

Operational Definitions

Health is a defined as a state of absolute somatic, psychological and social well-being and not merely the non-existence of illness and infirmity (Preamble to the Constitution of the World Health Organization, 1946).

Health equity is the exclusion of unfair and avoidable or remedial differences in health among social groups.

Health inequities are health differences that are socially produced, systematic in their distribution across the population and unfair. These are differences among groups that are unnecessary, avoidable, unfair and unjust (Whitehead, 1992)

Hypertension is defined as elevated blood pressure consistently at or above a systolic of 130 mmHg (≥130mmHg) or diastolic at or above 80 mmHg (≥80mmHg)

Hypertensive: A patient who has elevated blood pressure consistently in ≥3 consecutive BP readings. They may either be on antihypertensive drugs or non-pharmacological therapy for elevated BP based on WHO criteria (BP≥130/80mmHg).

Intermediary determinants are individual level influences, including health related behaviours and physiological factors.

LMIC are countries classified as Low- and middle-Income Countries.

Mental Illness refers to disorders that affect an individual's mood, way of thinking and his/her behaviour. Examples of mental illnesses and conditions include, but are not limited to depression, anxiety disorders, schizophrenia, eating disorders and addictive behaviors (Mayo Clinic)

Millennials are the cohort consisting of individuals born between 1982 and 2004 (Neil H. and William S, 1991)

Non - Communicable Diseases (NCD's) are medical conditions that are not transmissible directly from one person to another.

Risk Factor: A characteristic statistically associated with, although not necessarily causally related to, an increased risk of morbidity or mortality.

Stage 1 Hypertension is defined as elevated blood pressure whose readings are between a 130-140 mmHg (Systolic) or 80 - 90 mmHg. It was previously known as Pre-Hypertension.

SDH: Social determinants of health are the conditions, in which people are born, grow, live work and age. These circumstances are shaped by the distribution of money, power and resources at global and local levels.

Wellness is a state that allows the individual to have of harmonious, stable and all rounded growth in the Somatic, socio-economic and psychological dimensions of Human existence.

Abstract

Non-Communicable diseases (NCDs), are defined as medical conditions or diseases which are neither transmitted from one person to another nor deemed as infectious. Main Non-Communicable Diseases include Cardiovascular diseases, Obesity, Cancer, Diabetes, Neurological Diseases, Mental illnesses, Injury and Chronic respiratory diseases. These diseases, if not well managed become very costly to manage, can lead to debilitating complications or premature loss of life.

The study therefore aims to examine the determinants of Non-Communicable Diseases among the millennials in Kenya. Specifically, the study was to determine the Biometric parameters (BMI and Blood Pressure) of Millennials undergoing Primary care treatment at the Mater Misericordiae Hospital and examine the socio-demographic characteristics affecting Non-Communicable Diseases of the millennials attending clinics at Mater Misericordiae Hospital.

The study adopted the descriptive cross-sectional study design. The sample size was 375 research tools. Cross-Sectional Data was collected using a questionnaire. Purposive sampling technique was involved to collect data. Data was analysed applying descriptive statistics and effects of the determinants to hypertension were determined using Probit regression analysis.

The study found out that elevated Visceral Fat and a variety of socio-demographic attributes of the clients were significant determining factors of hypertension. The study thus recommends that millennials should constantly involve themselves in physical exercises, stop smoking and alcohol intake and should also avoid a lot of fat, sugar and salt.

1 CHAPTER ONE: INTRODUCTION

1.1 Background Information.

Non-Communicable diseases (NCDs), are defined as medical conditions or diseases which are neither transmitted from one person to another nor deemed as infectious. Main NCDs include Cardiovascular diseases, Obesity, Cancers, Diabetes, Neurological Diseases, Mental illnesses, Injury and Chronic respiratory diseases (WHO, 2014). These NCD's are currently leading as the world's highest causes of mortality, causing about 41 million deaths per year. This is 71% of all mortalities globally, with over 85% of these "premature" deaths occurring in Low- and Middle-Income Countries (WHO, 2018. Non- Communicable Diseases). The World Health Organization (WHO) predicts that deaths due to NCDs will escalate over the next decade by 17%, the highest escalation occurring in sub Saharan Africa at 27% and the east Mediterranean region at 25%. This is a big blow to the Low- and Middle-Income Countries (LMICs), including Kenya, who now have a double burden of disease (WHO, 2002).

LMICs have a Double burden of disease because they are now experiencing an increase in NCDs yet still have the enormous economic burden brought about by infectious and Communicable Diseases (CDs) including Tuberculosis, Pneumonia, Malaria, Diarrheal diseases, HIV/AIDS etc. which they have been trying to deal with, but are yet to bring under control. This means that due to the prevalence of the more serious communicable diseases, only 1% the donor assistance is allocated to the training, management and/or eradication of the NCDs (Hotez and Daar, 2008). The continued engrossment with these communicable diseases by the donor community leads to very little attention being given to NCDs (Kirton, Guebert, and Kulik forthcoming). This is unfortunately an untenable and unsustainable arrangement, because the Socio-economic costs of the NCDs are recurrent and very high. According to studies, NCDs will account for $47 trillion of the world's economy in productivity loss, direct healthcare costs and premature death over the next 20 years (NCD Alliance, 2010). The combination of the two groups of diseases (i.e. NCDs and CDs) is therefore bringing about strong and adverse pressure on the already delicate and frangible health structure of the countries in Sub-Saharan Africa. This will unfortunately result in an inauspicious and adverse outcome on the resident population's health.

In 2016, 71% (40.5 million deaths) of all global mortalities were from NCDs. Age distribution showed that about 4% of the mortalities (1·7 million NCD mortalities) occurred in individuals younger than 30 years, 38% (15.2 million) of the mortalities occurred in individuals aged between 30-70 years, while and 58% (23·6 million NCD Deaths) occurred in 70 + years. This clearly shows that over 40% of all NCD deaths can be termed as Premature deaths because they occur in ages below 70 years, which is the current lifespan. Looking at the causal agent or Disease, 80% (32·2 million of the NCD mortalities) were attributed to Chronic Obstructive Pulmonary Disease, Cancer, Cardiovascular diseases and their complications, as well as Diabetes, while only 20% were attributed to other forms of NCDs. It therefore behooves us to look at and tackle NCDs more seriously.

A study done by WHO on 186 countries and territories showed very high incidences of NCD related deaths, with over 85% of countries having a much higher likelihood of premature deaths secondary to a NCD, compared to communicable and infective diseases, maternal, antenatal and perinatal, as well as nutritive conditions combined (NCD Countdown 2030). They have therefore been established as a clear threat to human health accounting as much as 80% of all premature (untimely) NCD mortalities and leading to a threat to development and economic growth both locally and globally. These diseases are preventable, through eliminating or reducing the shared major risk factors associated with behavior or lifestyles. i.e. smoking and use of Tobacco, detrimental or injurious diets, minimal or absence of Physical activity and the excessive or harmful intake of alcohol (WHO, 2002).

1.2 Problem Statement

The burden or load brought about by NCDs has markedly increased in the last few years and the rate of increase is set to accelerate. NCDs were previously marked as diseases of the old and rich. Recent advances have however shown that NCDs are no longer conditions associated with the rich or developed world, neither are they of the old population. Global statistics show that about 45% of the disease burden among the adult population, in this case, regarded as 18 years or older, within the countries classified to be within the low- and middle-income bracket, is directly caused by NCDs.

The risk associated with NCDs as measured by age-standardized DALY percentages, are higher in LMICs than in the high-income member states (WHO, 2018). There is therefore higher premature death than the population in high-income countries. Kenya, being in the LMIC bracket, has a population that is developing NCDs at younger ages (CSA Kenya, 2017). The probability of premature death in Kenya, from a Non-Communicable Disease is approximated to be 18% (WHO, 2015). Although this indisputable increase in NCDs is occurring among the youth, financing for the NCD awareness, prevention and early management programmes is inadequate within the health sector. This upsurge in incidence and prevalence of NCDs is occurring in the environment of reducing allocation and disbursement of funds by the government to the health sector, as a ratio of total expenses by the government (GoK, 2015). The combined allocation to health in Kenya has persistently remained almost constant at between 7.5 – 7.7 percent of total government budget between 2014-2017 (MOH, 2017). This has not met the agreement made by the involved countries during the Abuja Declaration, 2006. The agreement stipulated that the expenditure allocation to health should not be less than 15% of the total budget outlining the government expenditure.

Hypertension falls under the Cardiovascular diseases group, one of the most common NCDs. However, Hypertension is considered a silent killer in many circles due to its silent progression. Many times, hypertension is diagnosed when it has already caused complications like Heart Failure, Blood Vessel thickening, kidney dysfunction, haemorrhagic strokes, heart attacks etc.

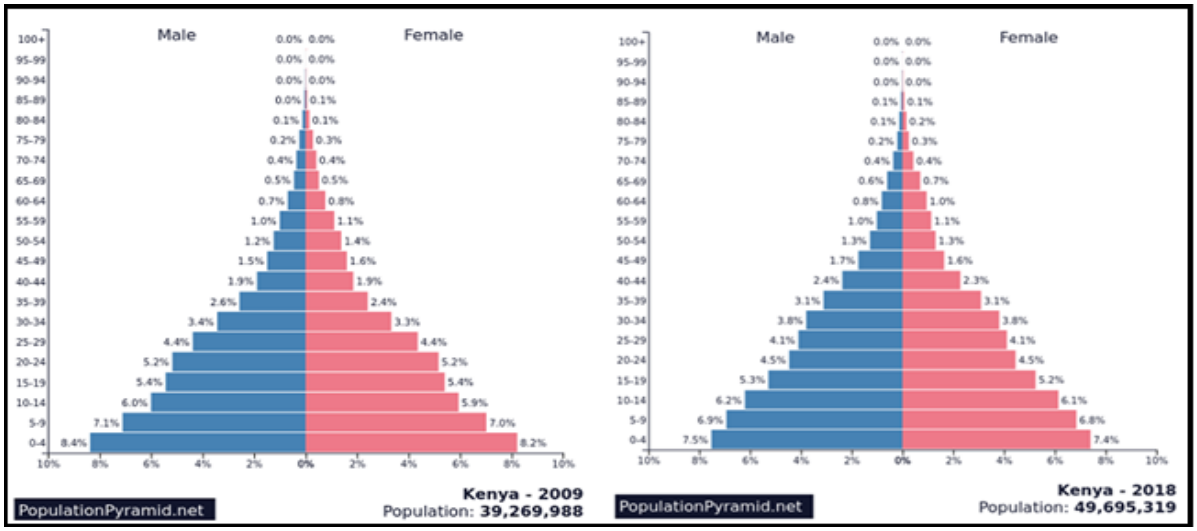
In Kenya, at least 60% of mortalities attributed to NCDs occur prematurely, compared to only a quarter (about 25%) in high-income countries such as Australia. Premature death or Premature mortalities are defined as mortalities that occur before completion of the average expected life expectancy in a certain or specified population. In Kenya, these are deaths that occur among people whose age is less than 70 (NCI Dictionary of cancer terms). Just as in Global indices, diseases of the Cardiovascular system, as well as their complications are the predominant causative factors of NCD related mortalities in Kenya. These are closely followed by Chronic Obstructive Airway Disease, and Diabetes. A huge percentage of NCDs occur as the consequence of four main risk factors associated with behavior or lifestyles. i.e. smoking and use of Tobacco, poor diet, absence of or inadequate Physical

activity and the excessive or injurious intake of alcohol (MOH, 2015). We have concentrated on the older population (50 years and above), while the diseases seem to be affecting younger and younger populations. According to WHO Health statistics summarized for NCDs, Kenya's Risk of Premature mortality as a result of NCDs in 2016, for the ages between 30 and 70 years was found to be at (13%) with 14% being males and 13% females (WHO, Global Health Observatory data)

In many countries, NCDs are being studied due to the burden they have on the countries' economy. However, a lot of focus is going to the older generations (40 and above) and the young are not a priority compared to other diseases despite the impact of NCD's on public health. One of the reasons behind this lack of focus is due to of lack of data to help in development of strategies (Thrift et al., 2014). NCDs have a serious impact on the economy due to increased health costs, disability, reduced productivity, absenteeism and overstretched healthcare budget to families, health system and the nation. Significant numbers of individuals are undiagnosed and, among those diagnosed, treatment is frequently inadequate.

The Kenya's Population has increased by over 10 million citizens in the last 9 years. The following Population Pyramids show that the Millennials (Age 20-39) account for over 30% of the current population and hence looking at the population growth over the 9 years, the population growth among these millennials accounts for more than 3 million. The proportion of young people (millennials) has therefore increased, meaning the proportion of those at risk has increased. Other than age, we note a change in the lifestyles, psychological and mental status, especially stress levels, that the millennials have adapted, and this sets the millennials at higher risk of Hypertension among other NCDs.

Figure 1.1: Kenya Population Pyramids, 2009 and 2018



Source: https://www.populationpyramid.net/kenya/2018/

Most surveys show an increase in other factors that have been established to increase the incidence of NCD's. Globally, the prevalence of drug abuse among the millennials is higher than among the older generation (UNODC, 2016). A survey by NACADA in 2017 clearly showed that there is an increase in the prevalence of alcohol, drugs and other substances among the young individuals between the ages of 15-35 years as compared to the other age groups (NACADA, 2017).

Using the same trajectory, Kenya's NCD burden will more than triple if left unresolved. A shift in focus therefore needs to be implemented, to aid Awareness Programs that educate on Prevention, early detection, and Early treatment.

1.3 Study Objectives

The Broad objective of this project is to study the determinants of Non-Communicable Diseases among the millennials in Kenya. The Specific objectives include:

i. To Determine the Biometric Parameters (BMI, Body Fat and Visceral Fat Percentages and Blood Pressure) of Millennials undergoing Primary care treatment at the Mater Misericordiae Hospital.

ii. To examine the Socio-Demographic Characteristics of Non-Communicable Diseases affecting the Millennials, attending clinics at Mater Misericordiae Hospital.

1.4 Research Questions

i. What are the Biometric Parameters of Millennials undergoing Primary Care Treatment at the Mater Misericordiae Hospital?

ii. What are the Socio-Demographic Characteristics of Non-Communicable Diseases affecting millennials, attending clinics at Mater Misericordiae Hospital?

1.5 Significance of the Study

Many health-related international bodies, donors, governments, as well as health practitioners have noted the rising trend, as well as the rate of premature mortalities related to NCD cases within the global context. Hypertension is of particular concern because it is known as a silent killer especially in the LMIC and is therefore detected (in many cases) when it has already caused complications and target or end organ damage. Lots of studies have been done among the age group of 40+ years. However, contrary to popular belief, the NCD burden is being felt by people younger than the population targeted for NCD awareness, monitoring and treatment. NCD data is not readily available, and more so data targeting the millennials. Data on Hypertension prevalence from Kenya varies in quality and availability; thus, researchers use data from smaller studies and other countries as proxies. This study seeks to provide data on the prevalence of hypertension among millennials in Kenya as a result of the many risk factors, sedentary lifestyles or decreased physical activity leading to obesity, presence of stress and mental illness, inappropriate or poor diets, and tobacco use.

This study seeks to assess the Hypertension disease burden among the millennials as a result of the major lifestyle risk factors. The findings and recommendations from this study will therefore be useful to policy makers, the Government of Kenya, as well as donors in estimating the disease burden of NCD and hence expanding their NCD focus to involve the millennials.

Furthermore, findings and recommendations of the study will be beneficial to stakeholders to document the best implementation strategies such as strategies for health education and health awareness practices, for the prevention, monitoring, early diagnosis and treatment of Hypertension among millennials.

The findings will also assist the Ministry of Health (MOH), and other stakeholders to think about the cost burden of NCD, both current and in the foreseeable future. This study will assist the ministry, as well as insurance companies in the development of financial & technical assistance to support the families, counties and the country at large in its efforts to lower negative cost effects of NCD.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section examines existing research findings on the determinants of NCDs among the millennials in Kenya. Besides, the section additionally presents the review of past studies on theoretical and empirical approach in respect to the determinants of NCDs among the millennials in Kenya. Additionally, current arguments with debates concerning impact of the determinants of NCDs among the millennials in Kenya were examined.

2.2 Theoretical Review

2.2.1 The Grossman Theoretical model

This model has been studied in this case to look at the relationship between the individual's Behavioral, Biological, Mental, Lifestyle and Social – Economic factors and how they influence the presence or absence of disease.

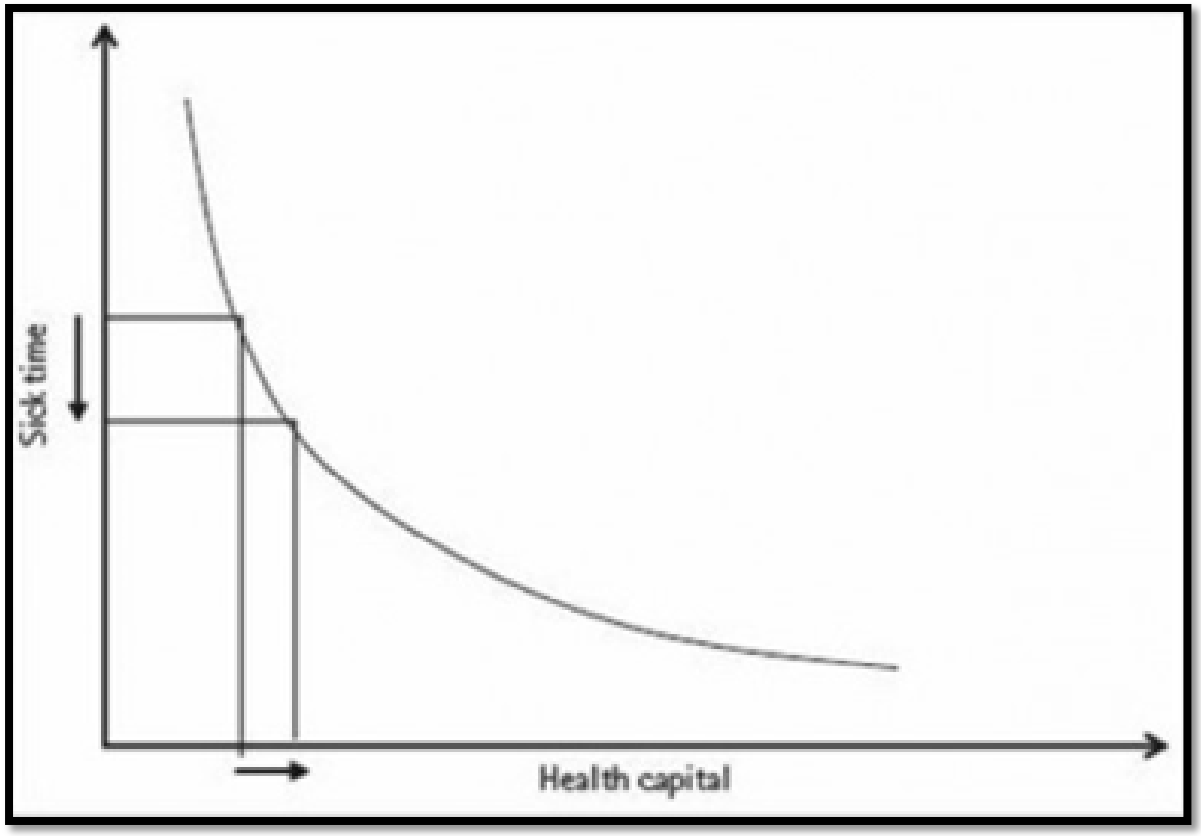
The Grossman Model of Health Capital (Grossman, 1972) is a well-known model that views health as a long lasting, inherited capital good which devalues over time. Using Grossman's model, health is defined both as a production good, where investment in health is made through medical care purchases and other inputs that are affected by the Social and Economic Status of the individual. Health is also defined as a consumption good where healthier people are happier. Health depreciation or devaluation is described and interpreted as the natural deterioration of health over time. The nexus behind Grossman's model of demand for health is how the different determinants like age, level of attained education, income and resultant health status etc. lead to the demand for health capital and hence influence the production of health. Using Grossman's model, we understand that by connecting and bringing together time and health inputs, then the individuals become both producers and consumers of their own health stock.

The Theory used in Grossman's model is:

365 days – TH - TL = TB + TW ……...…… 1

Where TH is time devoted to improving health, TL is unrecoverable time due to illness, TB is leisure time and TW is time consumed while working. This is known as Optimal Health Stock as depicted in Figure 2.1

Figure 2.1: Relationship between Health Stock and Time devoted to Improving Health

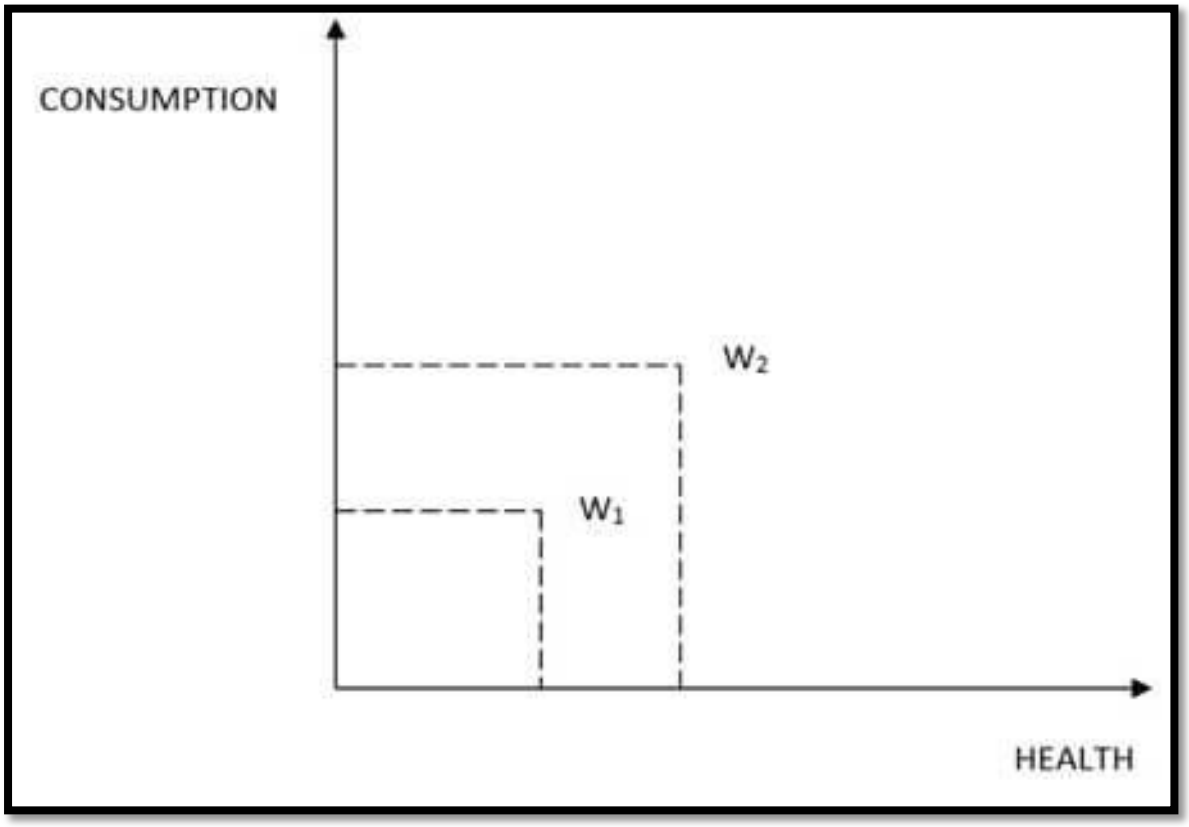


Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

To explain the model, we can use an example of a working man who falls sick with a chronic illness like Kidney disease. He pays out of pocket for his clinical reviews and medications. A year later, the man decides to allocate more time devoting in improvement of his health (TH). He therefore substitutes sitting in front of a TV (TB) or time consumed while working (TW) to increase his activities through exercise. If this is applied to Grossman's model, the outcome will be healthier and happier days and fewer sick days (TL). Therefore, the outcome and fruit would be a thorough optimization of the individual's health stock as a sequel of the increasing his investment in health (x-axis) and a reduction on

unrecoverable time due to illness (y-axis), consequently increasing his competence (TW). The improved ability to work (TW) shall potentially increase his pay, moving him up to a better indifference curve as indicated in figure 2.2, leading to better quality of life and improving the health stock of his family as well. This would potentially increase the requiescence time to devote in health and healthy activities, as well as increase the consumption and utilization of additional (non-health related) goods and services, leading to augmented financial and economic growth

Figure 2.2: Indifference Curve showing Improved Well-being

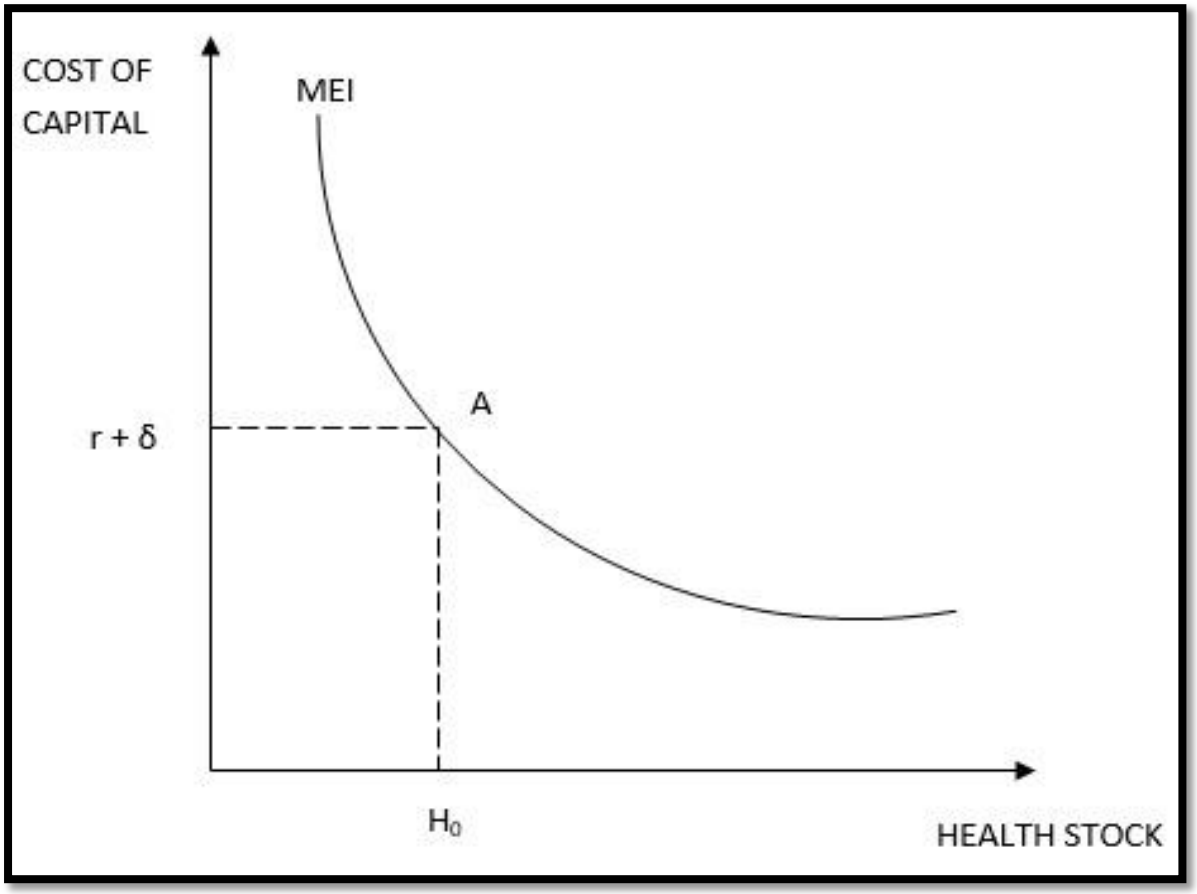


Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

This improvement in the father's health stock also has an impact in his family's tendency to work on improving their health. For example, this dad can now devote more resources such as premiums on his children's health or medical investments, enabling the children to have access to a greater inventory and quantity of health stock in their latter days. This plenitude of the children's health stock accrued over time means that in their future, they should have a greater probability of having more healthy days, hence less absenteeism from their

activities such as school attendance, leading to an increase in the value of these children's education, potentially leading to higher wages in future and hence ability to afford healthier lifestyles. Therefore, Grossman's model indicates to us that people are inclined to investing in health by reason of the potential benefits surpassing the potential costs (i.e. time, lost wages, and recreation).

Figure 2.3: Marginal Efficiency of (Capital) Investment



Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

Marginal cost = $r + \delta$,

where r = rate of interest on other investments and δ = rate of health depreciation i.e. the opportunity cost

When the Marginal (Capital) cost is $r + \delta_0$, then the maximal capital quantity will be H_0, as shown in Figure 2.3. Where the two meet (Point 'A') depicts the equilibrium point, i.e.

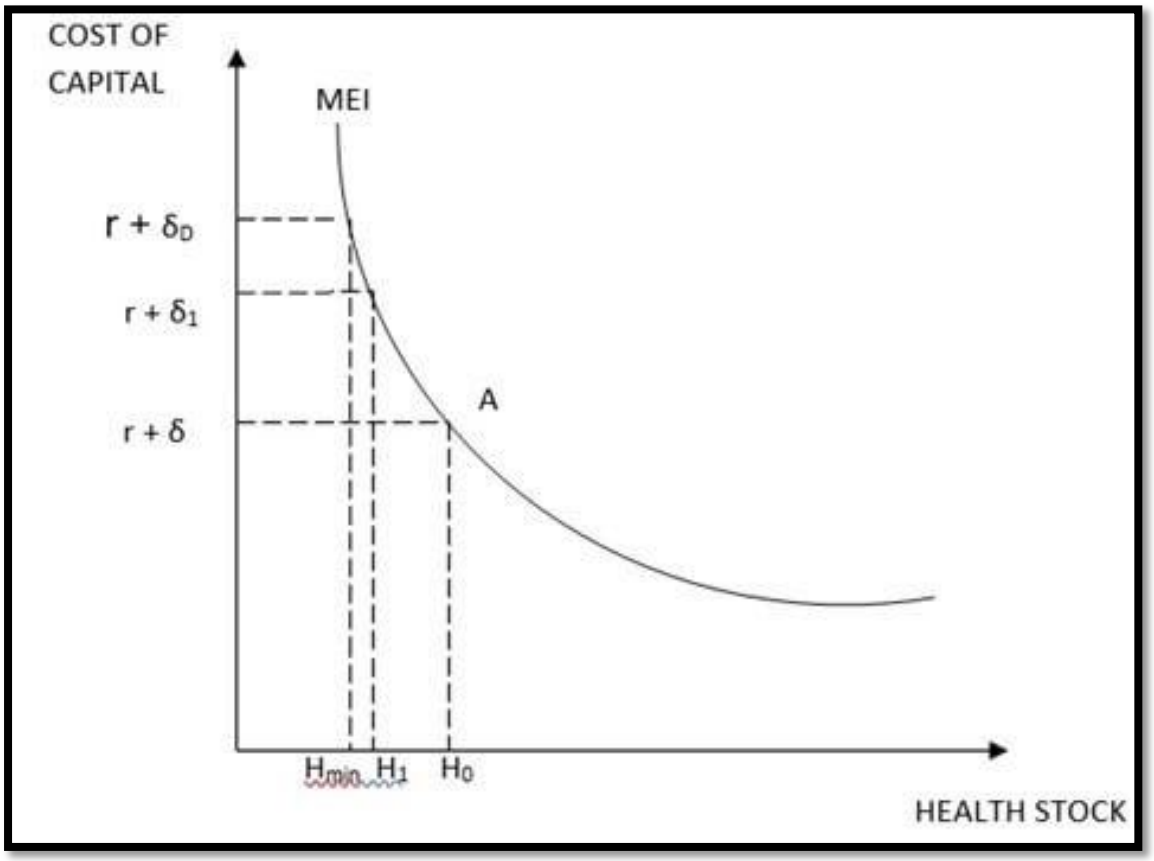
Marginal cost (of investing in Health) = Marginal benefits

There is an inverse relationship between health investment and actual health i.e. as health capital (outputs) increase, it is challenging to match with the contributions, hence generating health.

a) Effect of Age on Demand for Human Health Capital:

The rate of health stock depreciation (from δ to δ1 and then to δD) increases as age increases i.e. for older people, the deterioration in health would be faster than for younger individuals.

Figure 2.4: Effect of Age on Demand for Human Health Capital



Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

In this case shown in Figure2.4, the cost of capital would rise as the health stock depreciates, making the demand for health capital to fall (from H_0 to H_1 and then to H_{min}).

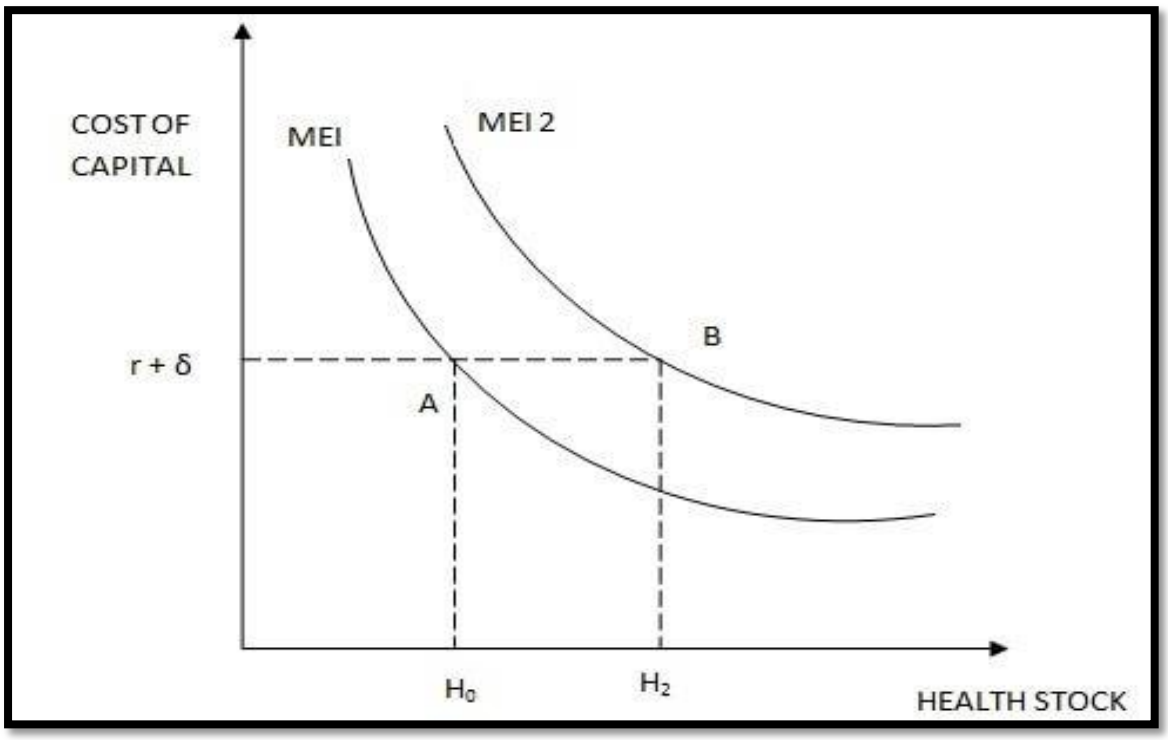
This depreciation causes the actual cost of Healthcare to rise and one can offset this rise by increasing the health investment (H).

Grossman's Model of Health Capital also showed a clear correlation between the Health Stock, as described using the Time invested to improve health and the Socioeconomic status (SES). SES can be determined by the individual's income as determined either by his/her occupation and/or education. The Social Economic Status (SES) plays a crucial role in determining an individual's future health stock and their capacity in investing in their health

b) Changes in Income/Wage Rate:

Whether the income changes or remains constant, the cost of capital does not change. This is because (r + δ) is constant. However, a better wage rate raises returns that are attained from happier and healthier days. Therefore, attaining a higher MEI curve.

Figure 2.5: Effects of Wage on Health Stock



Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

This figure 2.5, illustrates the influences of wage on the health stock. From the original curve, if Point 'A' is point of equilibrium at a lower wage rate on the original MEI curve,

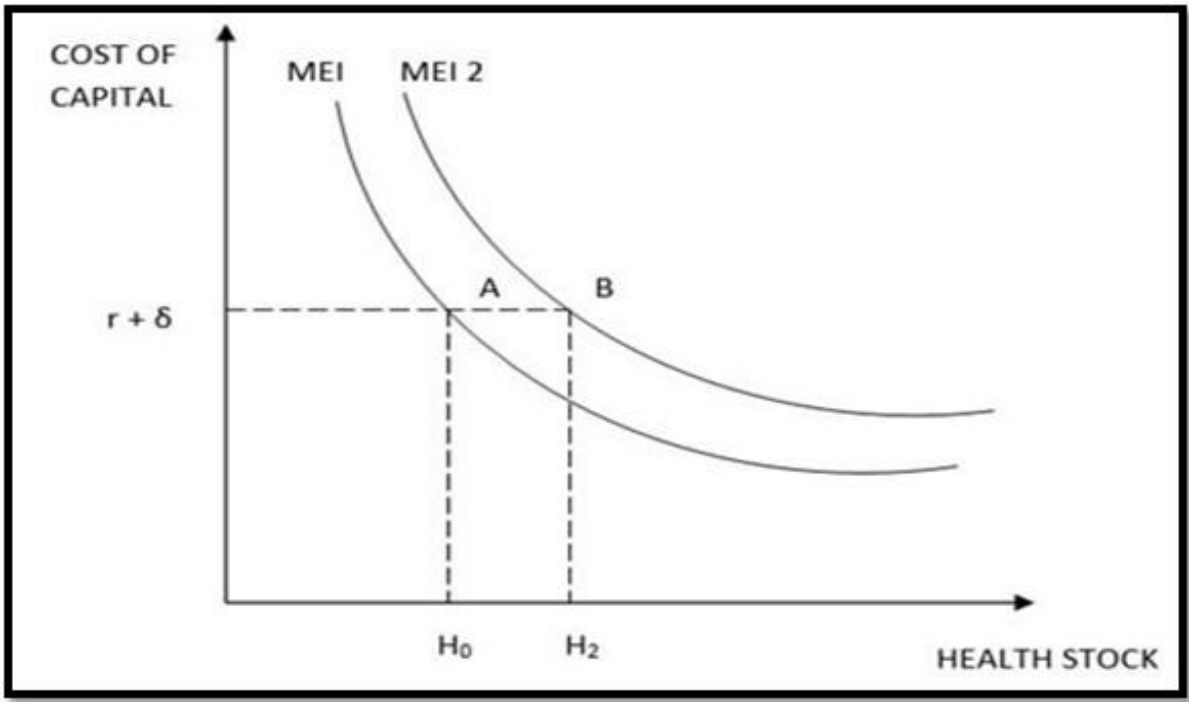
then optimal health stock is H_O. An increase in the individual's wage or income increases the benefits/returns of being healthy. MEI 2 curve therefore intersects at point B, causing a new equilibrium for an individual with a higher wage leading to a higher optimal/superlative health stock (H_2). In other words, with an increase in the amount of income/ level of an individual's wages, the optimal health stock is therefore higher (i.e. $H_2 > H_0$). However, for this increase in the health stock, there needs to be an increase in the inputs. Inputs such as time, money etc. need to be increased to augment the investment in the health capital.

Many studies on populations show how individuals with low incomes have lower health stock, leading to higher mortality rates at lower ages. Studies done in the United States indicated that a 20-year-old young male within the confines of the lowest income quartile (equal or less than 1 dollar per day) had, averagely, the equivalent health as an old, 60-year-old man within the confines of the top wage quartile. This was found to be due to lower investments to health capital. Low or no physical activity, poorer eating habits and lower access to healthy and fresh foods, poorer quality of life etc. Obesity was found to be 8.4% higher among the individuals in low wage groups, than in higher income individuals.

c) Effect of Education on Demand for Human Health Capital:

With the same thought process as for wages/income, Education has been shown to raise the efficiency of production especially the non-market production. Higher levels of education level increase the marginal product (MP) of direct inputs leading to better health stock. A more educated person would be more likely to invest higher in their health stock by increasing the time and monetary investments. An educated person is also at a more advantageous position when it comes to following treatment regimens, management plans etc. making them healthier faster. This will therefore lead to a higher MEI curve (MEI 2) as shown in figure 2.6. Therefore, the optimal health stock (at a higher equilibrium) which intersects at point 'B.' leads to a higher health stock for this more educated individual (i.e. $H_2 > H_0$).

Figure 2.6: Effect of Education on Health Stock.



Source: Grossman, M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy 80:223-255.

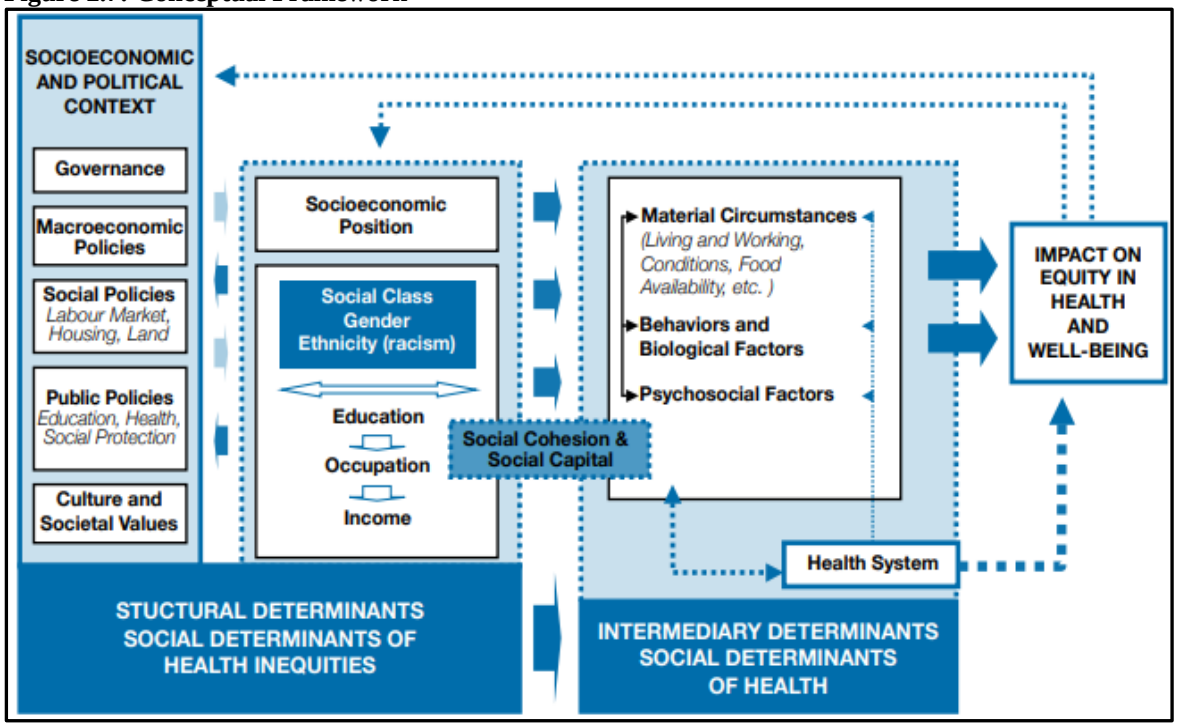
2.2.2 Conceptual Framework for NCDs

Many NCDs, inclusive of heart failure, as well as stroke culminate from the exposure to risk factors that may have been antecedent for several years. However, whereas there is a prolonged latency period (time from exposure to development of disease), the rate or range of occurrence of these NCDs may relatively but rapidly reverse once exposure to the risk factors is dealt with and eliminated (T Truelsen et al., 2001). In order to do this, there should

be a conceited effort to have a multi-disciplinary approach for the forestalling as well as the management of NCDs among the young (WHO, 2017).

Using the WHO framework, for social determinants of health, the conceptual framework depicted in Figure 2.7 clearly indicates the interplay between the structural and intermediary determinants, and how they affect the individual's health outcomes. It shows how context generates social stratification and accredits different social stratifications to individuals. This then gives rise to distinctive exposure to factors affecting health as well as financial resource availability. Social stratification also dictates contrastive outcomes of health (WHO, 2010).

Figure 2.7: Conceptual Framework



Source: World Health Organization: A Conceptual Framework for Action on the Social Determinants of Health https://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf

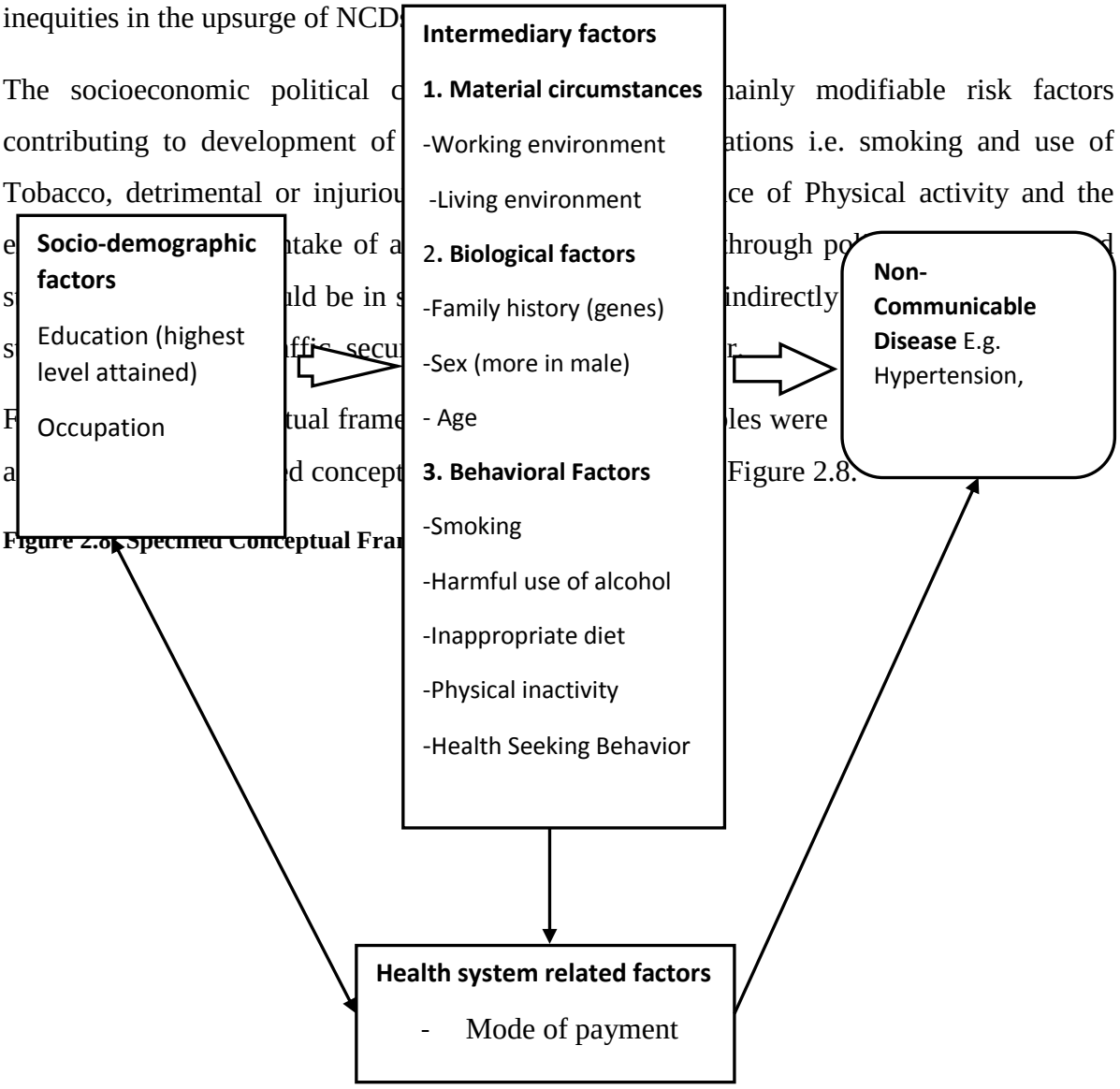
The framework identifies determinants in three levels; Structural determinants which include socioeconomic political context in areas of macroeconomic policies, governance, social and civic policies, societal and cultural ideals and values. Socioeconomic and political

mechanisms assign class or socioeconomic positions (SEP) where different individuals in the population are layered based on their Education, and hence occupation and income, Biographic data like Race, Gender, among others. These SEP then affect the status of intermediary determinants. The intermediary determinants reflect the individual's social status and hierarchy within the society. They also affect the recipients' inequalities when it comes to one's exposure and vulnerability to health endangering circumstances and illnesses that lead to differential health outcome (Solar & Irwin, 2010). Inequalities in accessibility to protection, risk exposure, and inaccessibility of medical attention are the root of key inequities in the upsurge of NCDs

The socioeconomic political c ainly modifiable risk factors contributing to development of ations i.e. smoking and use of Tobacco, detrimental or injuriou ce of Physical activity and the e ntake of a through po d s uld be in s indirectly s ffic secu r.

P tual frame les were a d concept Figure 2.8.

Figure 2.8: Specified Conceptual Fra



2.3 Empirical Review

2.3.1 Epidemiology

In recognition of the burden of NCD's, WHO developed several strategies including, Practical Policy for Primary Healthcare (WHO, 2008), The Global Strategy for the Prevention and Control of No communicable Diseases (WHO, 2008-2013) and the WHO Framework Convention on Tobacco Control, (WHO, 2008). Kenya in recognition of the NCDs burden has enacted several strategies, namely; the Tobacco act 2007; the alcoholics' drinks act 2010. However, more needs to be done in health promotion on the association of the risk factors and development of NCDs. The NCDs were explicitly acknowledged at the UN General Assembly as an eminent component that was omitted as the Millennium Development Goals (MDGs) were crafted. (Temu, F. et.al, 2014). In September 2011, a meeting was called of the United Nations General Assembly. This meeting discussed the whole NCD issue, including the modes of prevention and management of NCDs. Several resolutions were formulated and drafted accentuating the associations between the NCDs and the CDs, and a resolution arrived at for suitable integration. (United Nations, 2010)

2.3.2 Hypertension

Hypertension is persistent elevated systolic BP≥130mmHg or diastolic BP≥80mmHg (Journal of the American Heart Association, 2018). Comprehension and appreciation, as

well as the early detection, control and management of hypertension is very low, especially in countries within Sub-Saharan Africa, leading to the burden imposed by disease itself, as well as that of its many complications which include heart failure, stroke, peripheral vascular disease, coronary Artery Disease, retinal bleeding and detachment, visual impairment as well as renal failure. (Whelton PK, Carey RM, et.al). Poorly controlled HTN leads to several complications, Renal failure and stroke included (Jowi & Mativo, 2008). Hypertension was seen in 80% of stroke patients in a study done at Kenya's oldest, public, tertiary, referral hospital - Kenyatta National Hospital, in Nairobi (Jowi & Mativo, 2008) and in south Africa HTN was found in 55% of the patients (Connor et al., 2005). BP control reduces incidences of chronic Diseases (T Truelsen et al., 2001)**.**

2.3.3 Pre-Obesity and Obesity

According to WHO, BMI of 25-29.99Kg/M^2 is O**verweight** (Also defined as Pre-obese), and BMI ≥30.0Kg/M^2 is **Obese**, while BMI of 18.0-24.99 Kg/M^2 is considered **Normal** (National Institutes of Health, 1998)

$$\boldsymbol{BMI = \frac{Weight\ (kg)}{(Height\ in\ m)^2}} \qquad \text{..... 2.1}$$

There was a Threefold increase in the Obesity prevalence between the years of 1975 and 2016. The WHO found that in excess of 39% of the Global adult population (≥18 years) are overweight and at least 650 million (13% of adult population) are clinically obese, with a Gender distribution of 11% men and 15% women. Among these more than half a million of them will die of obesity related disease (WHO, overweight and Obesity 2016)

WHO estimates of 2008 showed that 4.2% of the Kenyan population was obese. While in 2016, Kenya ranked 162 with an obese adult population of 7.1%. (WHO, 2016). Interestingly, multiple studies that were carried out recorded a higher predominance of Pre-Obesity and Obesity in women than in men for example, Steyn NP and his team found a prevalence of 43.4% among women, as well as 34% among the men being overweight or obese (Steyn NP, Nel JH, et.al).This increasing prevalence is mainly being affected by the sedentary lifestyle that has been adopted, High calorie diet consumption, as well as urbanization. (Mathenge, W., Foster, A., & Kuper, H, 2010).

Obesity arises from energy imbalance. The gained weight is mainly due to higher consumption and absorption of energy from the individual's diet than what is expended by the individual as brought about by physical activity (WHO, 2002). Therefore, Obesity has been shown to cause higher morbidity and mortality. Pre-obesity and Obesity increase the risk of NCDs like Hypertension, Hyper-cholesterolaemia (high circulating cholesterol levels), Diabetes and stroke (Abbott & Sim, 2010).

Once treated as a problem in the high-income or rich countries, obesity is rising in the LMICs (WHO, 2013).

2.3.4 Body and Visceral Fat

Body Fat can be described as the fat that the body has, mostly located under the skin (known as subcutaneous Fat). The higher the imbalance between the high intake of inappropriate diet especially the high calorific diets and the low utilization of the same, through sedentary lifestyles, the higher the fat deposition. This has a direct effect on the Body weight as well as the BMI. Visceral Fat on the other side is the fat that deposits on the vital organs – such as the Pancreas, Liver, Kidney, Blood Vessels and around the heart. This is more dangerous because the higher it is, the more it poses a high risk of sudden cardiovascular events like heart attacks, stroke etc. (Hiroyuki Nagaretani et.al, 2001)

2.3.5 Mental Health

Mental health is described as "A state of well-being whereby persons acknowledge and grasp their capabilities, are capable of confronting and handling the standard and usual pressures of life, are productive and fruitful, and are involved in the positive improvement of their communities" (WHO, 2003), or (WHO, 2014).

Mental health is therefore a vital element in the overall community's health and socio-economic development. The roots of psychological health and mental illnesses not only include distinct characteristics such as the capability to manage one's emotions, communication, deeds, thoughts, and synergy with others, but also social, cultural,

economic, political and environmental factors such as national policies, social protection, living standards, working conditions, and community social supports. (MOH, 2016).

According to The National Institute of Mental Health (NIMH), many factors lead to mental illness and suicide rates among the young population, some of which are environmental. A study was conducted by research workers from several universities, hospitals, and the National Institute of Mental Health (NIMH), which are part of the National Institutes of Health on the ongoing trends in rates of self-annihilation, among U.S. teenagers (10-17years) in April 2017, post the launch of the Netflix show "13 Reasons Why," There was a 28.9% rise in the suicide rates according to this study as published in the Journal of the American Academy of Child and Adolescent Psychiatry. The results of this study highlight the enormous need to use best practices when representing or depicting suicide in popular entertainment as well as in the media and has a mandate to educate on the vulnerability of youth to the media and hence easily influenced. (Bridge et al, 2019)

WHO approximates that 60% of patients seen at the Primary Care facilities with physical ailments have a root mental disorder (WHO, 2008). In Africa most mental issues and conditions are attributed to either witchcraft or a spiritual problem. In Kenya, the same trend of increased Mental illness leading to increased suicide rates has been found among the young. Data collected by the Government's statisticians indicate one Kenyan in every four (1:4) Kenyans experiences an episode of mental illness at least once in their lifetime. It is supposed that as far as 25% of all outpatient cases and 40% of all in-patient cases in healthcare facilities are admitted either primarily or secondarily from mental illnesses (KNCHR: 2011).

However, the monetary allocation given to mental health is a mere 0.5% of the budget allocated by the Government to the Health Sector, thus leaving the mental equation thoroughly overstretched. 72% of WHO member states or countries worldwide have separated the mental Health Budget from the General Health Budget, choosing to allocate directly from the Primary Government's expenditure. Unfortunately, Kenya is not among these 72% countries. However, Kenyan Ministry of Health has adapted the Mental Health Policy, 2015-2030, and it encompasses a framework that is followed for securing reforms that will empower mental health systems in Kenya.

2.3.6 Mental Health and Substance Use

Worldwide, the use and misuse of psychotropic substances has reached alarming levels, with 2 billion people using or misusing alcohol, around 1.3 billion using tobacco in its many forms – either smoked as cigarettes or cigars, snuffed or chewed in its raw forms and 185 million young individuals using illicit drug. Annually, 5.9% of all mortalities (3.3 million deaths) globally are accounted for by harmful alcohol use. Alcohol is also mentioned or implicated as a factor causing morbidity in more than 200 illnesses and injuries. Universally, 5.1% of diseases and injuries are directly ascribable to alcohol, as measured in

DALYs – known as Disability- adjusted life years. The heavy intake of alcohol directly leads to morbidity and mortality among young people. Alcohol-related mortalities account for 25% of the total recorded deaths among the millennials. There is a clear and direct cause-effect connection that links harmful or habitual use or intake of alcohol (in its many forms) and a considerable group of psychosocial, mental, affective, and physiological disorders, as well as other NCDs, including physical injuries. Other than the sequelae seen in one's health, the habitual and excessive consumption of alcohol leads to notable economic, intellectual and social losses to the ones involved in the alcoholism as well as the society they are part of at large. (MOH, 2016).

2.3.7 Monitoring and Achieving Set Goals on NCDs in Member Countries

During the General Assembly's High-level Meeting on the Determent and Control of NCDs that was held during the month of September 2011, the Political Declaration on Non-Communicable Diseases (NCDs) was adopted by the UN General Assembly. Subsequently, WHO developed a universal monitoring framework to permit and allow for global tracking of progress in preventing and controlling major NCDs as shown in Figure 2.9 and their key risk factors.

Figure 2.9: NCD Targets and Indicators, as adapted from the WHO Global Monitoring Framework

Source: NCD Targets and indicators, accessed on 26th June 2019 and adapted from https://www.who.int/nmh/global_monitoring_framework/en/

To achieve the commitments of the UN Political Declaration on NCDs, the WHO also developed the "Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020." This was endorsed by Heads of State and Government in September 2011. The "Global Action Plan" will contribute to progress on 9 global NCD targets to be attained by 2025, including a 25% relative reduction in premature mortality from NCDs by 2025 and a halt in the rise of global obesity to match the rates of 2010.

2.3.8 Social Demographic Characteristics of NCDs

The high in social class have more access to knowledge, money, power, prestige, and social connections and are therefore more enabled to refrain from risks and embrace health protective strategies like exercise and better diet. The stratifiers for SES include; education, occupation, income, gender, race/ethnicity (Solar & Irwin, 2010).

Education is an antecedent of employment and therefore, directly or indirectly, of income. Education reflects the availability of material, intellectual and other resources of the family

of origin. Education has no definite beginning. it commences as soon as one is born at early ages, and it is influenced by access to and performance in primary and secondary schools. Education captures the long-term impacts both early on in their lifetime, situations on adult health and the influences of adult resources in health. The expertise, skills and aptitudes attained through education may impinge on a person's rational functioning, make them more amenable to health education messages, or better enable them to convey and gain access to suitable and essential health services. Education also impacts on health care seeking behaviour of individuals. It also influences involvement in high risk behaviors. The KDHS 2008/2009 showed that men with secondary education or higher have a lower tendency to smoke than men with lower education (Calverton & Maryland, 2008). Higher education levels have been economically associated with better health (Locker, n.d.). In this study will look at the highest level of education attained.

Occupation is strongly connected to wage or income, as well as the level of Physical activity or inactivity. In Economic theories studied, occupation has been found to be pertinent in one's health outcomes due to accessibility and availability of certain advantages or benefits and entitlements, like medical insurance covers, easier access to a variety of high-end facilities and even better quality of healthcare, accessibility to knowledge making one's ability to follow management protocols better, and better, cleaner residential facilities. Occupation may reflect perception of social class which in turn affects your social networks. One's occupation directly impacts on their mental health by either having to deal with work-based stress, responsibilities, control, choice and self-determination, and, hence through psychosocial and physical processes, tend to affect health. Occupation directly determines environmental and work exposures such as physical demand. Some occupation determines food consumed, involvement in physical activities, smoking and excessive use of alcohol. (Solar & Irwin, 2010). Some occupations are highly stressing and hence lead to the individual being involved in some risky behavior like smoking. Some occupations are health protective, for example, those involved in religious activities are not allowed to smoke and take alcohol. Some religions also prohibit meat consumption. In this study will measure the type of work done.

Income is a strong indicator and determinant of an individual's socio-economic position. Income measures the components directly linked to material resources. It is closely linked

with the accessibility, affordability of health. It is known to directly influence one's health seeking habits. Income can directly affect circumstances which either directly or indirectly affect one's health. Income is a measure of material living standard. Higher or better income affects health through allowing for better access to higher quality and appropriate resources like foods that are low in cholesterol, fruits and vegetables, BP machine and glucometer for self-monitoring at home, a house with provisions for physical activities e.g. inhouse Gym, More desirable availability or access to beneficial services, which directly enhance health e.g. recreation activities, or education, Improved Health seeking behavior and health facility/quality selection, Medication (Solar & Irwin, 2010). A study in Mombasa showed that, the poorer the quintile, the worse the health profiling as far as risk factors were concerned, compared to their privileged counterparts (Tawa, Frantz, & Waggie, 2011). Income will make one access smoking cessation programmes and rehabilitation centers for alcoholics and disability which are currently unaffordable for the poor.

Gender based roles and responsibilities can be assigned by the society we live in, to the extent of defining differential employment conditions for women and men. Males are in most cases involved in extreme and stressful working conditions. This can lead to differential vulnerability, exposure and health risks linked to work (Solar & Irwin, 2010). Males suffer more from NCDs, especially Hypertension and Mental illness, compared to their female counterparts (Kenya Mental Health Policy 2015 – 2030). As such, in order to cope, these men tend to engage in health damaging behaviour like Substance Abuse, Excessive Alcohol intake and smoking. The societal expectation in men is that men should be bread winners. In the case where they are unemployed, or the income does not meet family needs, stress, Anxiety, Depression sets in and so they indulge in risky behaviour such as smoking and use of Tobacco, and the excessive or injurious intake of alcohol. Due to modernisation and adaption of western culture, it will be difficult to clearly get the impact on health brought by roles and responsibilities of gender. In this study will note the Gender of the recipients.

NCD's are currently the commonest causative agents leading to premature death globally, with an approximated 41 million recorded mortalities annually. This accounts for 71% of all global mortalities, with over 85% of these "untimely" deaths manifesting in the LMICs. (WHO 2018). For a long time, NCDs were considered a disease of the old, the rich – and of

rich countries. However, multiple studies have proven this to be wrong. Closer home, A case of Kibera Sub-County, on Factors Influencing the Performance of NCD Awareness Programmes (Wachira, 2016) showed clearly that the NCD burden has already affected the poor within the LMICs, in this case, a slum known as Kibera in Kenya. Awareness to NCD Prevention and early management is therefore what is needed to aid in financing.

2.3.9 Intermediary Determinants

Intermediary determinants are personal level inspirations and effects, involving health associated actions and physiological aspects. The intermediary determinants create and bring about health inequalities (Solar & Irwin, 2010). This study will look at the Living Environment and material circumstances, Behaviors which are health damaging, Biological factors(sex) and the Health System using the WHO building blocks.

Environments one lives in determines whether individuals take up habits like harmful use of alcohol, intake of tobacco in whichever form i.e. whether processed or raw, by smoking, chewing, snuffing etc., poor diet as well as engage in physical activities. Consumption of potential (healthy food), physical working and neighborhood environments provide resources for health and health risks (Solar & Irwin, 2010). Motorized transport has led to physical inactivity. Urban infrastructure does not have provisions for walkways and pavements for people to do physical activities like jogging, cycling. There's insecurity in most lower neighborhoods so people are not able to engage in physical activities. Most estates do not have recreation facilities.

There has been a perceived correlation between the Living Environment and the type of diet one engages in. In the low income or informal settlements, the most available foods are high carbohydrate foods, rich in cholesterol and sodium. These types of foods will lead to inappropriate diet thereby increasing chances of development of Non-Communicable Diseases. Overweight and obesity which occur due to the inappropriate diet lead to metabolic changes leading to increase in BP, unfavourable cholesterol, increased resistance to insulin and increased chances of complications (WHO, 2003). The informal settlements also make tobacco products and alcohol easily accessible. People living in these settings therefore get easily involved in smoking and harmful use of alcohol. In the informal

settlements it is also difficult to enforce the set policies such as Tobacco act 2007 on protection of people from passive smoking.

The Working Environment affects the development of NCDs in multiple ways. Within the scope of this study, we shall look at a Stressful environment, a sedentary environment and the informal sector. The working environment can be stressful. If systems and policies are not in place for stress management people tend to indulge in risky behaviours to overcome the stressful circumstances. (Solar & Irwin, 2010). However, the working environment can also lead to a sedentary lifestyle if one sits the whole day while at work, leading to Physical inactivity. This is known have a direct effect on one's health by increasing the incidences of Obesity, Diabetes and/or Hypertension. A study in the armed forces showed that there was a higher prevalence of Non-Communicable Diseases, specifically Hypertension, among soldiers who were deployed to peace missions. (Mundan, Muiva, & Kimani, 2013). The stressful working environment led the soldiers to try cope using Tobacco, excessive and harmful alcohol use, and eating carbohydrates dense diets. Conversely, working in the informal sector can also lead to exposure to passive smoking. This is because policy implementation may be difficult, such as the setting up of the free smoking zones.

Stress is defined as the psychological awareness of pressure, and the body's response to it. When there is an imbalance between the demands within the environment and the person's ability to meet them, then stress is said to have developed. A small amount of stress is normal, and beneficial to man, because when they encounter challenges and uncertainties, they are able to respond to these challenges making them better individuals. However, extreme stress affects not just the psychological, but also the physical body. Imbalances could include psychosocial stressors e.g. negative or adverse life events and job strains. Stress is known to have both the direct and indirect repercussions on an individual by influencing and encouraging harmful and risky behaviors attributed to high blood pressure (WHO, 2002). In response to stress, multiple hormones and enzymes are released to try deal with the stress at hand. Cortisol, the Stress Hormone is released, leading to increase in alertness. Cortisol then triggers the Serotonin Hormone, which in turn makes the individual crave for and turn to bad foods (High Sugar, High Cholesterol junk foods), directly resulting in weight increment and/or obesity. The enzyme Renin is also released which reacts with angiotensin and causes constriction of blood vessels, leading to High Blood Pressure. Stress

brought about by job insecurity or outright unemployment is also noted to be a root cause of higher rates of chronic illness for all family members.

2.3.10 Behavioural, Lifestyle and Biological Factors

Five of the commonest NCDs i.e. Cardiovascular Diseases and their complications, Cancer, Obesity, Chronic Respiratory Disease and Diabetes, are all connected by preventable, though common biological or organic risk influences, particularly elevated blood pressure, elevated lipid levels and overweight or obesity, as well as three linked key behavioral and social risk factors, namely Inappropriate diet, Sedentary lifestyles, Harmful alcohol use and Tobacco use (WHO, 2002). The 2016 WHO estimates for Kenya showed increase in the risk factors as presented in the Table 2.1.

Table 2.1: The 2016 WHO estimates for Behavioural risk factors in Kenya

Behavioral risk factors	Male	Female	Average
Harmful use of alcohol (%)	6	1	3
Physical inactivity (%)	13	16	14
Excessive Salt intake, (g/day)	4	4	4
Current tobacco smoking (%)	19	1	10
Raised blood pressure, adults aged (%)	21	19	20
Raised blood glucose (%)	4	4	4
Obesity (%)	3	9	6

Source: WHO 2016 estimates for Behavioural risk factors in Kenya

Tobacco consumption is one of the chief behavioural and lifestyle factors in this society. Nicotine (the active ingredient is cigarettes) causes stimulation of the central nervous system bringing about an increased catecholamine release, which in turn raise the heart rate and BP (Mundan et al., 2013). In the 2002 world report, tobacco use caused 4.4% disease burden (WHO, 2002). Tobacco kills not less than 8 million persons per year. Over 7 million of these mortalities are direct consequences of explicit tobacco consumption, whereas around 1.2 million are known as secondary smokers. These are non-smokers who are exposed to second-hand smoke. Of the 1.1 billion smokers worldwide, around 80% live in the LMICs, where the burden associated with tobacco-induced illness and death is heaviest. Smoking is specifically hazardous if you have high blood pressure, it increases the risk of cardiovascular complications like stroke more than five times. 10% of deaths from stroke (a complication of the NCDs) are due to smoking (Stroke association, 2013). In a study in 22

countries smoking contributed to 18.9% of the stroke cases (O'Donnell et al., 2010). In Kenya less than 1% of women smoke and 19% male admitted taking any form of tobacco with 18% of men smoking cigarettes (Solar & Irwin, 2010)

Inappropriate Diet has in many cases been implicated as a major causative factor in the progression of a variety of NCDs. A balanced diet contains carbohydrates, proteins, vitamins, fats, minerals, fiber and water in correct proportions (Mundan et al., 2013). It provides adequate energy and nutrients for maintenance of body functions. Eating fruits and vegetables reduces risk of NCDs. WHO recommends five portions each day. In the UK 13% of men and 15% of women eat the recommended five per day (Abbott & Sim, 2010). High intake of fruits and vegetables has a positive effect on health. Inappropriate diet is at times influenced by general availability of foods due to the system as a whole or the accessibility and affordability of the same. It can also demonstrate an individual's instinctive inclinations modified and altered by both cultural and family influence. It also reflects the individual's monetary, economic and political ability and independence to employ and enjoy these preferences (WHO, 2002). Eating high amounts of fruits and vegetables has been shown to reduce the likelihood of developing NCDs by 30%. Salt on the other hand is harmful to one's health and higher intake of salt increases the risk of Hypertension. Daily recommended salt intake is 5g (WHO, 2002). The effects of salt intake are even worse if added onto the food after cooking i.e. on the table. To encourage increased appropriate diet, such as consumption of fruits and vegetables, whole grains etc. education among the young should promote healthy campaigns, on healthy diet. Sectors like Agriculture can be allocated enough money to promote farming of fruits and vegetables. In this study inappropriate diet will be measured using WHO Steps instrument (WHO, The Steps Instrument).

There are Four main fronts that present openings for Physical Activities in any one's daily lives. These can be categorized as Openings at work, (especially if there is manual labor involved), Transport method/mode, such as cycling or walking briskly, whether as time set aside or to work), in domestic duties (such as gardening or housework) or in leisure activities (engaging in sport activities). Physical inactivity is described as the lack of or inadequate physical activity in either of these fronts. Global physical inactivity is 17%. Physical inactivity was found to be the underlying causative agent in 1.9 million deaths as

well as causing 22% of ischemic heart diseases (WHO, 2003). Increasing one's activity levels has been leveraged as a very inexpensive method of reducing the risk of development of NCDs and their complications by up to 27%. Majority of the people, especially the millennials and younger generations are leading sedentary lifestyles. The urban infrastructure and motorized transport as greatly contributed to physical inactivity. Physical activities have been shown to be beneficial to the human body by reducing the risks of cardio-vascular diseases, reducing body and visceral fat and therefore improving glucose metabolism. This directly lowers body weight, blood sugar and blood pressure leading to reduction in Non-Communicable Diseases, notably Hypertension, Diabetes and their complications.

One glass of red wine is said by researchers to slightly benefit the heart and blood vessels, providing protection from coronary heart disease, atherosclerosis and even stroke. But these perceived positive effects on specific and normal biological processes disappear once we go over the one drink mark. The larger amounts of alcohol end up producing the inverse effect. The large amount of alcohol within the blood stream alters cell membrane and allows more calcium to enter, reducing Sodium absorption, augments constriction of the blood vessels by affecting certain hormones and neurotransmitters, as well as inhibiting endothelium dependent vasodilatation (Mundan et al., 2013). The 2002 world health report approximates that alcohol caused 4.0% disease burden. Globally consumption of alcohol has increased with most or of the harmful use being seen in developing nations (WHO, 2003). This has increased over the years, with the WHO Factsheet in September 2018 showing that 5.1 % of the global infirmity and injury load boils down to harmful use/abuse of alcohol, as evaluated by DALYs. Consumption of Alcohol is the root source of death and disability much earlier in life. About 13.5% of morbidities and mortalities among the 20–39-year-old age groups are alcohol-attributable, (WHO on Alcohol, 2018).

Health Seeking Behaviour reflects the value that a population places on health. Societal beliefs, values and myths also affect how citizens of a given region will seek health and healthcare. A study on stroke that was conducted by (Walker et al., 2010) in Tanzania demonstrated that there was more NCD (Specifically stroke) incidence in urban areas compared to the rural areas. Other non-conventional health seeking habits were noted as the main drivers. These included Review at Pharmacies (instead of compliance to medication

and follow-up by Medical Practitioners at hospitals), Traditional healers and use of herbal medicine etc. Another study by MSF in India on malnutrition showed that malnutrition was not regarded as a disease. However, local notions were identified that explained the range of clinical symptoms of undernutrition. The Senior or older family members as well as the village elders had a consequential impact affecting the behavior of parents of critically malnourished children regarding their ability and willingness to seek health. (Burtscher, D; Burza, S, 2015).

2.3.11 Health System Related Factors

The Kenyan constitution revised and adapted in 2010 prescribes that Health is a basic human right (Constitution 2010). The government therefore should implement policies that lead to provide universal health coverage for the citizens. According to WHO, The Direct payments at point of seeking health or end point of health delivery should be avoided because it results in financial catastrophe and impoverishment. The government should therefore identify and implement Central sources of financing for the health system, as well as identify and implement equitable prepayment and pooling of finances at population level. (WHO, 2010, Basic Principles for Achieving Universal Health Coverage). The existing healthcare infrastructure needs to be oriented to meet the emerging rise in NCDs, while empowering community through health educations. The community needs to be empowered in terms of knowledge to enable them carry out healthy campaigns.

The Health ministry has a crucial and vital responsibility of synchronizing the roles as well as and harmonizing collaboration with other government ministries and institutions behind the development and implementation of policies on appropriate food and its production, agriculture and farm practices, youth and gender, education, media and entertainment, sports, business, finance, and commerce as well as industry, transportation, social affairs and urban planning (Waxman, 2005). The health system has a major role in assessing and monitoring morbidity and mortality, directly or indirectly attributed to NCDs, the extent of exposure to the NCD related risk factors, as well as the societal, behavioural, commercial and economic factors which determine health status of the population, by reinforcing health information systems (Waxman, 2005). The world health report 2002 seeks to communicate the risks clearly and openly to the public (WHO, 2003).

3 CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter recounts and narrates the processes, methods and techniques used in the research to process data from respondents.

3.2 Study Design

This adopted descriptive cross-sectional study, on the Determinants of NCDs among the working Millennials who have been seen at by Mater Misericordiae Hospital, Nairobi. A descriptive design involves the use of statistical methods in processing raw facts into information. Consequently, the research design was deemed fit to establish the determinants of non-communicable diseases among the millennials in Kenya.

3.3 Study Area and Population.

This research was executed using data that was collected by Mater Misericordiae Hospital, during Triage, conducted within the A&E Department of their main branch in Nairobi, located on Dunga Road, South B, Nairobi.

Conducting a study together with this hospital was a representative of how widespread the NCD risk is, among the working millennials. It also showed the need for more stringent policies and strategies at the contextual stage, hence cause behavioral modification among the young of various socioeconomic backgrounds, to affect the differential exposure and vulnerability which will result.

3.4 Target Population

The study ear marked all clients who, are of the Millennial Working Age Group (20-39), who were seen at Mater Misericordiae Hospital, during the month of data collection. Clients who did not give consent for the study, those clients outside the Study Population's age bracket or very sick patients were excluded from this study.

3.5 Sample Size and Sampling Procedure

3.5.1 Sample Size Determination

To establish the proportion and hence the size of the sample to study and work with from large and undefined populations, Cochran (1963) worked on and developed the following equation to provide an illustrative and indicative sample size.

$$\boldsymbol{n_0 = \frac{z^2 pq}{e^2}} \quad \text{..... 3.1}$$

This statement is well founded where $\mathbf{n_0}$ is the size of the sample to be determined, $\mathbf{Z^2}$ is the abscissa of the normal curve that cuts off an area α at the tails. This means that 1 – α is equal to the intended confidence level i.e. 100% - 5% = **95%. e** is the range of precision aimed at; **p** is the gauged percentage concerning a specific characteristic available or existing in the targeted population; while **q** is calculated from 1-p. From statistical tables we obtain the value of Z. It represents the area under the normal (bell) curve. This study took into consideration the fact that many individuals are attended to at the Accident and Emergency Department at Mater Hospital. Therefore, the assumption was that:

P =0.5 (maximum variability), with a **95% confidence interval** and **±5% precision**. The sample size will therefore be calculated to be:

$$\boldsymbol{n_0 = z^2\, pq/e^2 = \frac{1.96^2(0.5)(0.5)}{0.05^2} = 385\ Patients} \quad \text{.....3.3}$$

3.5.2 Sampling Procedure

Having sought the approval from the ethics committee at Mater Hospital before commencing data collection, we used the Stratified Random Sampling method because the patients in the hospital were heterogeneous with reference to their ages and gender. The strata were the Gender (Male or Female) of ages (20-39) years old. Within each stratum, simple random sampling method was used to identify and select the patients who were then approached for consent and then given the questionnaires for filling as they were within the hospital.

During data collection, clients who did not give consent for the study, those who were outside the Study Population's age bracket and those who were very sick patients not to a point of participating in this study were excluded in this study.

3.6 Model Specification

Model specification calls attention to the ascertainment of which independent variables should be included or excluded from a regression equation. (Springer, Boston, MA, 1997). The Probit model was applied to analyze the factors determining Non- Communicable Disease - Hypertension among the Millennials in Kenya. The dependent variable (Y) studied in this model is the presence or absence of the Non-Communicable Disease (Hypertension).

Where 1 = Presence of Hypertension, where the Blood Pressure is >130/80

0 = Absence of Hypertension where the Blood Pressure is <130/80.

The Independent variables were determined predicated upon the current and existent literature as well as the survey questions. Therefore, Pre-Obesity/Obesity, Physical inactivity, Education level, Occupation, Family history, Inappropriate diet, Harmful use of alcohol, presence or absence of Relaxation, Emotional Disposition and Tobacco use were incorporated into the model. Income was not directly studied and included due to the sensitivity it poses.

$$\mathbf{Y_1 = f\,(X_1 + X_2 + X_3 + X_4 + X_5 + X_6 \ldots + \varepsilon_1)} \quad \ldots\ldots 3.4$$

In our case, the Model was specified by:

$$NCD = \beta_0 + PO + BF + VF + PI + Ex + E + O + LE + SH + K + WE + HF + D + S + A + T + ED + HI + R + \varepsilon_1 \quad \ldots\ldots 3.5$$

Where NCD is Hypertension (measured by BP $\geq$ 130/80), and the Independent Variables are indicated in table 3.1.

Table 3.1: Model Specification Variables

Variable	**Measurement**	**Expected Sign**
NCD (Hypertension)	Actual BP Measurement 0 = BMI < 130/80 1= BP ≥ 130/80	None
Pre-Obesity/Obesity (PO)	Actual BMI Measurement 0 = BMI < 25 1= BMI ≥ 25	+
Body Fat Percentage (BF)	Actual Fat Measurement 0 = Body Fat < 30% 1= Body Fat ≥ 30%	+
Visceral Fat Percentage (VF)	Actual Fat Measurement 0 = Visceral Fat < 10% 1= Visceral Fat ≥ 10%	+
Physical Activity (PI)	Engagement in physical exercise per WHO STEPS 0 = Cycling/Walking 1= Motorized Vehicles	+
Exercise (Ex)	Regular Exercise 0 = More than 3 Times a week 1 = Less than 3 Times a week	+
Education (E)	Level of education attained 0 = Education ≥ Secondary Level 1= Education < Secondary Level	+
Occupation (O)	Type of work done 0 = Manual, Field work or office work seated <5 hours a day 1= Office work seated ≥5 hours a day	+

Living Environment (LE)	Living Environment 0 = Upper middle/High income areas 1= Informal/Low-middle income areas	+
Altered Sleep habits (SH)	Change in sleeping habits 0 = No 1= Yes	+
Altered Diet habits (K)	Change in eating habits 0 = No 1= Yes	+
Working environment (WE)	Stress/Anxiety/Depression 0 = Absence of Mental illness 1= Presence of Mental illness	+
Access to Hospital Facility (HF)	Payment Mode in accessing Healthcare 0 = Insurance or other 1= Cash	+
Diet (D)	Deep fried Foods, Sugared and High Fat 0 = < 2 servings per week 1= ≥ 2 Servings per week	+
Salt (S)	Adding salt to cooked food - rich in salt 0 = < 2 servings per week 1= ≥ 2 Servings per week	+
Alcohol (A)	Use of alcohol per WHO steps 0 = No Alcohol intake 1= Alcohol intake	+
Tobacco (T)	Use of tobacco in any form as per WHO steps 0 = No history of smoking 1= Smoking	+
Emotional Disposition (ED)	0 = Generally/ Sometimes Happy 1 = Usually Unhappy	+
Health impact on	Absent from activities/impact on work	

activities (HI)	by one's health 0 = No impact/a little bit 1= Moderate and above	+
Relaxation (R)	Ability to Relax 0 = Daily/Often 1= Seldom/Tense	+

Source: Author's own computation.

3.7 Diagnostic Tests.

3.7.1 Normality

We used the Normality test to determine how well modelled the data set is, by a Normal distribution as well as to work out the likelihood for normal distribution for a random variable underlying the data set.

3.7.2 Multicollinearity

Multicollinearity in our study may be brought about by the Data collection method employed whereby sampled over a limited range of the regressors, or where there may be a small number of patients about whom the data was collected on a large number of variables, as well as from the possibility that a common shared trend occurred over the time whereby the data collection took place. To test for multicollinearity, we used Statistical software like SPSS, to calculate Variance Inflation Factors (VIF) for all the studied independent variables. These were interpreted as A VIF value of 1 indicates no correlation between the studied independent variable and the other variables, VIF of 1 to 5 suggests a moderate correlation, though not serious enough to justify corrective measures. On the other hand, VIF values of greater than 10 would depict critical grades of multicollinearity which would mean the coefficients studied were poorly approximated, and the resultant p-values are debatable (Hair et al., 1995).

3.7.3 Heteroscedasticity

It tests whether the variance of the errors from a regression is dependent on the values of the independent variables. If this is present, then heteroscedasticity is present. To test for

heteroscedasticity in this regression model, we used the Breusch–Pagan test. (Breusch, T., & Pagan, A.,1979). The test statistic for the Breusch-Pagan-Godfrey test is:

$\mathbf{N * R^2}$ (with k degrees of freedom).

Where N is the size of our sample, R^2 is the (Coefficient of Determination) of the regression of squared residuals from the original regression and K is the number of independent variables. This test for heteroscedasticity typically follows a chi-square distribution.

We developed a null hypothesis for this test that the error variances are all equal, meaning there is homoscedasticity. And therefore, an alternate hypothesis stating that the error variances are *not* equal. More specifically, as Y increases, the variances increase (or decrease). This was run through SPSS. A small chi-square value (along with an associated small p-value) indicated the null hypothesis was true (i.e. that there was homoscedasticity).

3.8 Data collection Tools

Data was gathered using primarily the qualitative methods. Measurement of Bio-metric Parameters such as the individual's Weight, Height, Body and Visceral Fat as well as Blood Pressure was collected and written down by the investigator. A pre-tested and scientific, semi-structured questionnaire in conformity to the WHO stepwise concept and technique for the close observation of chronic diseases, was used for data collection. The questionnaire consisted of demographic characteristics, patients' history on behavior regarding physical activity, smoking and tobacco use, alcohol intake, diet, as well as factors affecting their compliance with management. The open-ended questions were coded.

3.9 Data Collection Procedure.

Data was collected in two ways. Individuals who fit the criteria were selected and serial numbered. They were also given to research assistants who approached them and began data collection procedures. An anonymous, but serial-coded Questionnaire was administered. Upon filling of the Questionnaire, the respondent's Height, Weight, Body Fat, Visceral Fat and BP were collected as part of their triage. The measured Blood Pressure, Height, Weight, Body Fat and Visceral Fat were input in the forms. Declining to take part in the study did not hinder the clients/patients from accessing treatment. The interview was

conducted in English in a room where only the respondent was present. I kept a list of the patients who had participated, to avoid repetition.

3.10 Training of Research Assistants

Two Nurses and Three research assistants with knowledge on field data collection were recruited and trained by the Principal researcher on administration of study questionnaire. Training was including; description of study objectives, sampling technique, ethical considerations, Data collection method and Data entry.

3.11 Pilot study

A pilot test, to pretest the study tools was conducted using a Local Clinic in Kasarani, Nairobi County. A sample size of 30 Participants were selected for the Pilot study. Each research assistant including myself interviewed the respondents under supervision. The pilot study was to assist in assessment of study tools and allow room for corrections and amendment of study tools.

3.12 Data Processing and Analysis

The collected data was then verified and cleaned prior to data analysis. Biodata and Demographic Characteristics of the patients were summarized using descriptive statistics for instance, the mean, Standard Deviations and proportions and these were displayed in the form of tables, Graphs, Histograms and pie charts, etc.

3.13 Validity of Instruments

Validity of the instruments alludes to how well a given test estimates/measures what it is purported to evaluate. The questionnaires were pre-tested at a local clinic in Kasarani. This clinic then became a non-participating clinic in the main Study. The pilot was done within three days, one week before the main study. After pretesting, these instruments of data collection, specifically the surveys forms, were appropriately tweaked, to maximize the validity of the collected data. This was done by removing ambiguous statements as well as troublesome /misunderstood words in the tool.

Extreme measures were exercised to improve rapport and gain the respondents' confidence by doing a full personal disclosure, introduction by the investigator and ensuring the research questions were worded in a fashion and approach that was non-judgemental and

non-intrusive into the respondent's personal life. Strict Confidentiality of the information was assured to the clients being surveyed. The respondents were also clarified for the aim and objectives of the research to avoid withholding of vital information due to fear of victimization. The investigator immediately took superintendence of all completed. All electronic gadgets (such as personal computer and laptops) that were used for the data entry, analysis and storage were password protected, while all flash discs as well as the hard copies of all documents were safely and separately stored by the investigator.

The research assistants were trained on the study objectives and data collection procedures and tools. Daily counterchecking of the filled questionnaire by the principal investigator was done. Support Supervision was done by the investigator during data collection. Data collected under the supervision was entered, analysed and interpreted by the principal investigator to minimize errors caused by different investigators.

3.14 Ethical Considerations

Prior to the definite outset of the research study, the following ethical measures were accomplished.

i. Approval to collect data was sought and obtained from the Mater Misericordiae Hospital's Standards and Ethics Sub-Committee to collect and use data during the patients' attendance at Accident and Emergency Department.

ii. There was no additional cost, risks nor any direct rewards to the participants.

iii. Confidentiality of the information received was maintained.

4 CHAPTER FOUR: RESULTS AND INTERPRETATION

4.1 Introduction

This section interprets, reports and presents the results of the data analysis such as response rate, tests of hypothesis, descriptive statistics and analysis of the studied NCD Determinants among the millennials in Kenya. Multiple, stepwise and linear regression analysis were performed to test hypotheses. Results were displayed in form of tables and figures. In addition, diagnostic tests were conducted. The results were explained and interpreted based on the output of the analyzed data. Hypothesis are also tested.

4.2 Demographic Characteristics of The Respondents

4.2.1 Response Rate

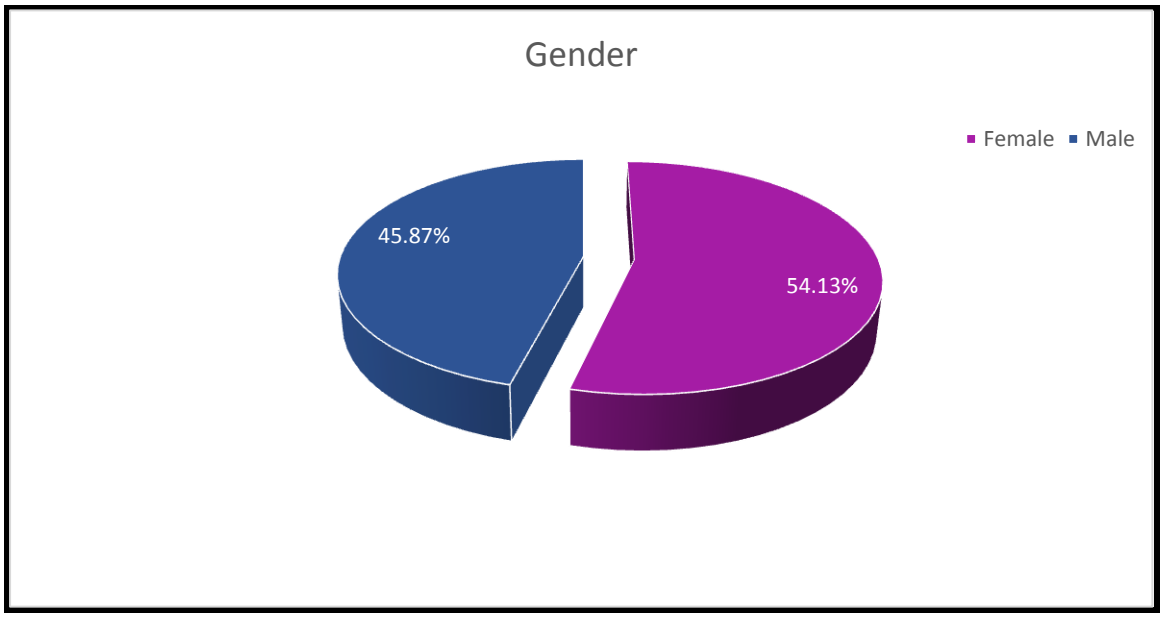
The sample for the study was 385 respondents; 375 questionnaires were distributed to the patients within the age (20-39) years who came for treatment at Mater Misericordiae Hospitals. This gave a response rate of 97.4%. According to Tomaskovic- Devey, Leiter, and Thompson, (2007) any response rate of about 15.4% is considered as yielding a relatively high response rate considering the demands of these patients in this Hospital. This high response was achieved since the demand of the clients to the hospital was high, research assistants were well trained, the Stepwise questionnaire was interviewer administered and the time was well utilized.

4.2.2 Demographic Information

The demographic characteristics of millennials, attending clinics at Mater Misericordiae Hospital included Sex, Age, and Level of education. They were processed and data was presented using graphs and tables.

Sex of the individuals described the participation of the respondents based on gender. The results were displayed as shown in the figure 4.1

Figure 4.1 Sex of the Respondents



Source: Author's own computation.

From figure 4.1, the bigger proportion of the respondents were found to be females who were about 54.13% and only 45.87% of the respondents were male.

The respondents were asked to state their Age and they responded as shown in the table 4.1

Table 4.1: Age of Respondents

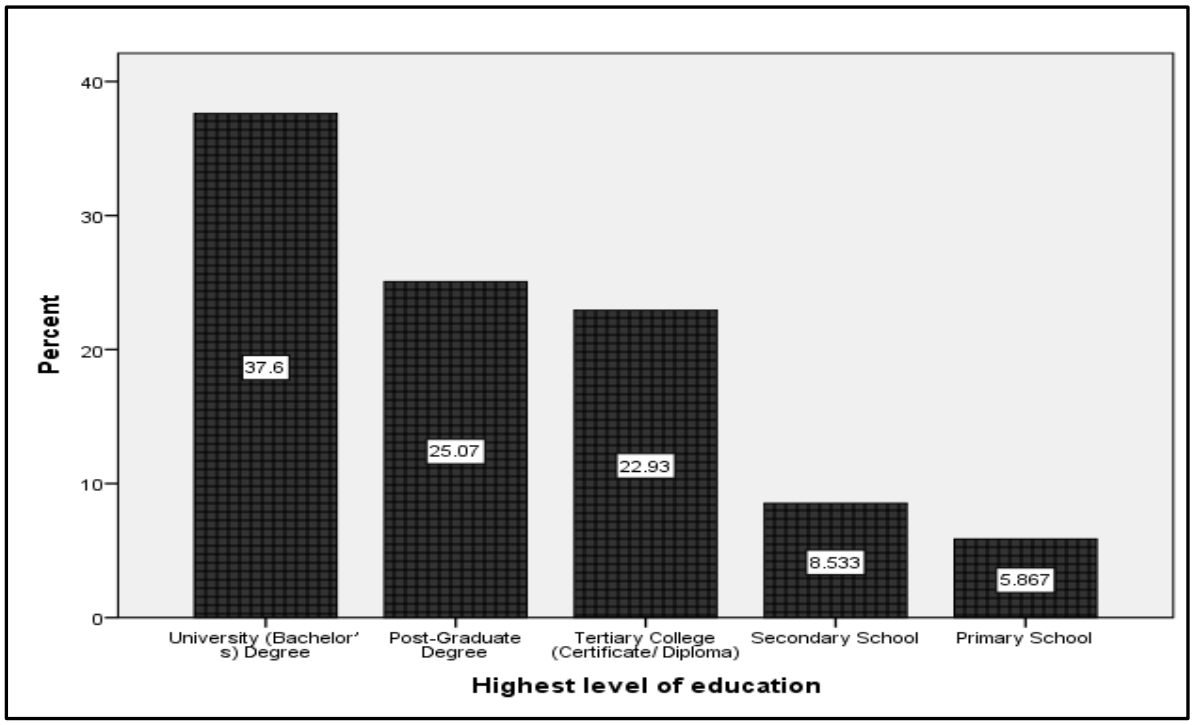
Age	Frequency	Percent	Cumulative Percent
20-24	15	4%	4%
25-29	105	28%	32%
30-34	136	36%	68%
35-39	119	32%	100%

Source: Author's own computation.

From Table 4.1, the bigger proportion of the respondents aged between 30-34 years and they were about 36%, 32% were of age between 35-39, 28% were between 25-29 years of age and 4% were between 20-24 years.

The clients under study were requested to indicate their Highest Education Level and they responded as portrayed in the figure 4.2

Figure 4.2: Level of Education

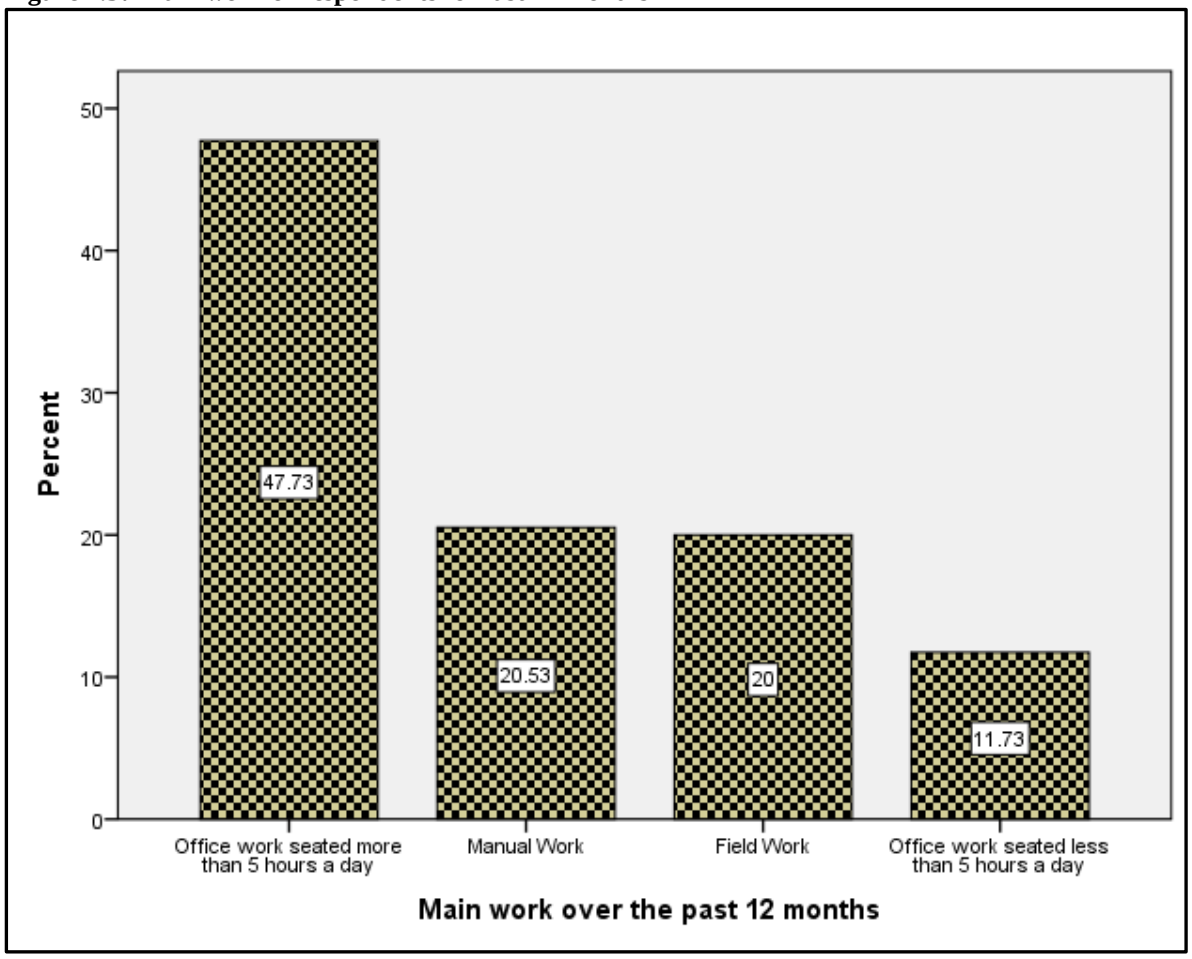


Source: Author's own computation.

From figure 4.2, bulk of the clients under study had achieved a bachelor's degree as their highest education level, these were about 37.6%, about 25.07% had post-graduate degree, 22.93% had tertiary college, 8.533% had Secondary school and only 5.867% of the clients denoted Primary school level of education level. Our demographics show that about 85.6% of the respondents had an educational level higher than Secondary education.

Openings for individuals to be Physically Active generally occur in four key spheres of their day to day lives. At work, (particularly if the assignment does not involve sitting down for 5 hours or more); In their means of transport (for instance walking or cycling to work); while carrying out household duties or in spare time (for instance, partaking in sports or recreational pursuits or hobbies). Physical inactivity is characterized by performing very little or no physical activity in any of these spheres. The respondents were asked to state the type of their main occupation for the last 12 months, to assess their level of activity during the work day and they responded as shown in the figure 4.3; as well as how they got to their workstations as is shown in figure 4.4.

Figure 4.3: Main work of respondents for last 12 months



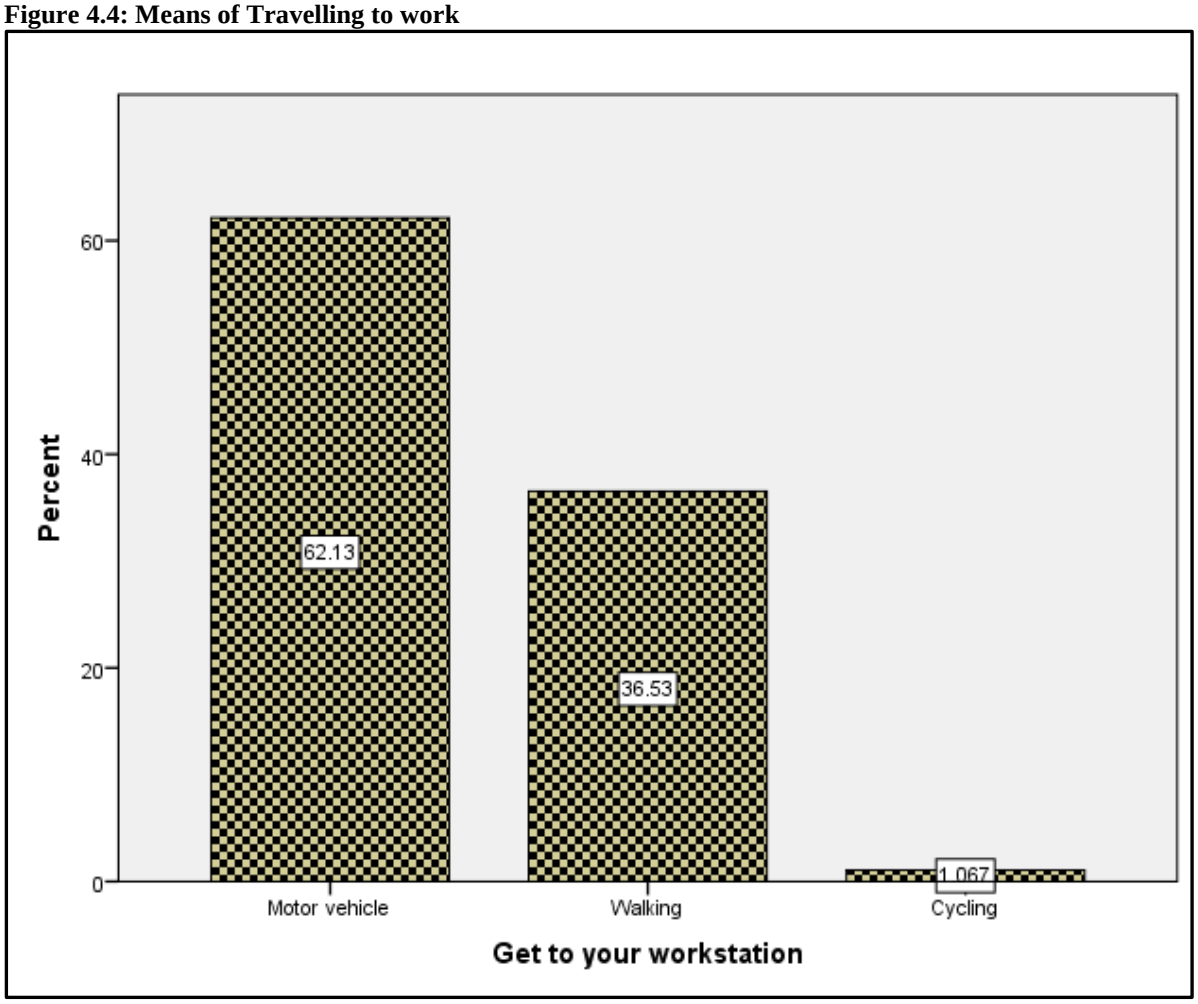
Source: Author's own computation.

From figure 4.3, the bulk of the respondents worked in the offices, seated more than 5 hours in a day over the last 12 months. These were about 47.73%. This indicated that in a normal

8-hour office job, the level of activity was low because these 47.73% of the individuals were seated at more than 62.5% of the working day. About 20.53% were doing manual work, 20% were doing field work and only 11.73% worked in offices for less than 5 hours a day.

The clients were also requested to state how they got to their workstation and they responded as demonstrated in the figure 4.4

Figure 4.4: Means of Travelling to work



Source: Author's own computation.

From figure 4.4, more than half of the clients under study got to their workstation by using motor vehicles, either private or public vehicles. They accounted for about 62.13%, while about 36.53% walked, and only 1.067% were cycling. This also had a bearing on the physical inactivity among the respondents, increasing the risk of hypertension.

4.3 Biometric Parameters

The first objective of this research study was to Determine the Biometric Parameters (BMI, Body Fat, Visceral Fat and Blood Pressure) of Millennials undergoing Primary care treatment at the Mater Misericordiae Hospital. The measured Biometric Parameters were processed using mean and standard deviation. The results were presented as shown in table 4.2.

Table 4.2: Descriptive Statistics of Biometric Parameters

	N	Minimum	Maximum	Mean	Std. Deviation
Height	375	140.00	200.10	167.3480	9.09193
Weight	375	34.95	138.80	74.5109	14.27123
BMI	375	14.2	46.2	26.590	4.7615
Body fat	375	6.70	53.80	24.7144	7.73841
Visceral fat	375	1	28	9.66	4.144
Systolic Blood Pressure	375	84	216	122.90	16.788
Diastolic Blood Pressure	375	53	122	78.64	10.651

Source: Author's own computation.

From table 4.2, the average height of patients was measured as 167.34cm ± SD 9.09193, with the shortest being 140cm and the tallest being 200.10cm. The patients had a weight average of 74.51kg ± SD 14.27123, with the lightest respondent being 34.95kg and heaviest weighing 138.8kg.

4.3.1 BMI, Body Fat and Visceral Fat

The average BMI was calculated and reported as shown in Table 4.2. It was found to be 26.59 ± SD 4.7615, which is an overweight or pre-obese population, as per the definition of BMI 25.0 kg/m^2 – 29.9kg/m^2 defined as being overweight and (National Institutes of Health, 1998). The study found out that about 60% of the recipients were categorized as either overweight (BMI of 25.0 kg/m^2 – 29.9kg/m^2) or obese (BMI ≥ 30.0kg/m^2), distributed as 41.6% of the respondents being overweight and 18.6% being clinically obese This concurs with the study done by WHO that found that in excess of 52% of adults were overweight or obese, distributed as 39% of the Global adult population (≥18 years) being overweight and

at least 13% of adult population being clinically obese, with a Gender distribution of 11% men and 15% women. Among these more than half a million of them are at risk of death secondary to obesity related disease (WHO, overweight and Obesity 2016).

The study also found out that there are more women who are pre-obese and obese (64.53%) than men (54.91%) as shown in Table 4.3

Table 4.3: Gender distribution of Pre-Obesity/Obesity

	N	**Minimum BMI**	**Maximum BMI**	**Mean BMI**	**Recipients with BMI ≥25.0kg/m^2**
Male	173	16.5	40.9	29.1	54.91%
Female	203	14.2	46.2	29.6	64.53%

Source: Author's own computation.

The findings in Table 4.3 concur with the study by (Steyn NP, Nel JH, et.al, 2016) who found out that there is a higher predominance of Pre-Obesity and Obesity in women than in men for example, Steyn NP and his team found a prevalence of 43.4% among women, as well as 34% among the men being overweight or obese.

From Figure 4.2, this study found out that the mean Body fat was 24.7144% ± SD 7.73841 which was within the accepted body fat percentage as per the findings of (Springer, Boston, MA, 1997) since it was less than 30%. On visceral fat, results indicates that the average was 9.66% ± SD 4.144. This was also less than 10% hence was within the acceptable range of being out of risks of developing NCDs.

4.3.2 Blood Pressure (Systolic and Diastolic).

Hypertension is defined as a persistent elevated Systolic BP ≥130mmHg or diastolic BP ≥80mmHg (JAHA, 2018). In our study, the Systolic Blood Pressure had an average 122.9mmHg ± SD 16.788, while the mean Diastolic Blood Pressure was 78.64mmHg ± SD 10.651 as shown in Table 4.2. Our study showed that 32% of the recipients had an elevated resting BP, as per the WHO guidelines of > 130/80. This is a significant disease burden due to the fact that the target group were all millennials of age 20-39 years. Global statistics

show that about 45% of the disease burden among the adult population, in this case, regarded as 18 years or older, within the countries classified to be within the low- and middle-income bracket, is directly caused by NCDs. This therefore indicates we should actively monitor the BPs of this younger generation as much as we monitor those at age 40+ years.

4.4 Diagnostic Tests:

4.4.1 Normality

Normality test was performed using Kolmogorov-sminov since the sample size was greater than 50 and confirmed using Shapiro-Wilk. The results were displayed in the Table 4.4

Table 4.4: Normality test.

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-obesity/Obesity	.439	149	.000	.581	149	.000
	.411	225	.000	.609	225	.000
Body fat	.429	289	.000	.592	289	.000
	.398	85	.000	.618	85	.000
Visceral Fat Percentage	.435	205	.000	.586	205	.000
	.406	169	.000	.612	169	.000
Physical Activities	.416	291	.000	.605	291	.000
	.442	83	.000	.576	83	.000
Exercises	.416	291	.000	.605	291	.000
	.442	83	.000	.576	83	.000
Education	.348	21	.000	.640	21	.000
	.426	353	.000	.595	353	.000
Occupation	.421	76	.000	.599	76	.000
	.422	298	.000	.599	298	.000
Living Environment	.417	117	.000	.603	117	.000
	.424	257	.000	.597	257	.000
Altered sleep habit	.418	194	.000	.603	194	.000
	.424	175	.000	.597	175	.000
Altered diet habit	.423	250	.000	.598	250	.000
	.420	122	.000	.600	122	.000

Working environment	.418	109	.000	.602	109	.000
	.423	265	.000	.598	265	.000
Access to hospital facility	.426	251	.000	.595	251	.000
	.416	122	.000	.604	122	.000
Diet	.453	147	.000	.561	147	.000
	.401	227	.000	.616	227	.000
Salt	.424	361	.000	.597	361	.000
	.352	13	.000	.646	13	.000
Alcohol	.414	154	.000	.606	154	.000
	.426	219	.000	.595	219	.000
Tobacco	.419	276	.000	.602	276	.000
	.429	89	.000	.591	89	.000
Emotional	.393	48	.000	.621	48	.000
	.426	326	.000	.595	326	.000
HI	.394	96	.000	.620	96	.000
	.431	278	.000	.590	278	.000
Relaxation	.425	211	.000	.596	211	.000
	.418	163	.000	.603	163	.000

Source: Author's own computation.

From Table 4.3, using Kolmogorov-sminov, the p-values for all the determinants were significant at p-value <0.05. Shapiro-Wilk also confirmed that all the determinants were significant at p-value <0.05, and hence it implies that there was normal distribution of the data for all the indicators that measure hypertension.

4.4.2 Multicollinearity test

Multicollinearity was tested using SPSS. We calculated VIF for all the studied independent variables. From our results majority of the VIF were close to 1. According to Hair et al., (1995), there was no correlation among parameters during estimation of determinants of NCD. The results were portrayed in Table 4.5

Table 4.5: Multicollinearity Test.

	Parameter	**Collinearity Statistics**	
		Tolerance	**VIF**
	Pre-Obesity/Obesity	.927	1.078
	Body Fats	.677	1.478
	Visceral Fat Percentage	.651	1.536
	Physical Activities	.801	1.249
	Exercises	.796	1.257
	Education	.713	1.402
	Occupation	.656	1.525
	Living Environment	.822	1.217
	Altered Sleep habits	.727	1.376
	Altered Diet habits	.800	1.251
	Working environment	.770	1.299
	Access to Hospital Facility	.783	1.276
	Diet	.782	1.279
	Salt	.887	1.128
	Alcohol	.929	1.076
	Tobacco	.929	1.077
	Emotional	.881	1.135
	HI	.796	1.256
	Relaxation	.836	1.196

Source: Author's own computation.

4.4.3 Heteroscedasticity

The heteroscedasticity was tested to find if the errors of the model are affected by the independent variables. The results were displayed as shown in table 4.6

Table 4.6: Tests of Between-Subjects Effects					
Dependent Variable: Blood Pressure					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6.821[a]	28	.244	19.372	.000
Intercept	6.209	1	6.209	493.699	.000
BinBloodP	6.187	1	6.187	491.961	.000
PreOB	.005	1	.005	.364	.007
BINBF	.000	1	.000	.008	.028
VFper	.050	1	.050	3.969	.007
Physic	.070	1	.070	5.555	.019
Exercise	.003	1	.003	.214	.044
Education	.003	1	.003	.252	.016
Occupation	.004	1	.004	.282	.006
LIVEEN	.006	1	.006	.509	.006
AlterSlep	.004	2	.002	.167	.006
Altereat	.029	2	.014	1.142	.020
Relaxation	.001	1	.001	.041	.040
AccTHop	.119	2	.059	4.729	.009
Diet	.008	1	.008	.670	.414
Salt	.004	1	.004	.326	.569
Alcohol	.034	1	.034	2.727	.100
Tobacco	.001	5	.000	.018	1.000
Emotional	.008	1	.008	.616	.433
HI	.028	1	.028	2.205	.138
R	.011	1	.011	.882	.348
Error	4.339	345	.013		
Total	935.853	374			
Corrected Total	11.160	373			

Source: Author's own computation.

Since all the independent variables had p-value <0.05 it implies that we reject the null hypothesis that there is heteroscedasticity. We therefore conclude that the error in the model

is not influenced by the errors of the independent variables and hence heteroscedasticity does not exist within the data set.

4.5 Regression Analysis and Discussion of Results

This was carried out using Probit regression model. The z- test, chi-square and p-value for each independent component in the model were processed to help in interpreting results.

4.5.1 Descriptive Statistics of Variables used in the regression

The second objective was to examine the socio-demographic characteristics of NCDs affecting the millennials, attending clinics at Mater Misericordiae Hospital. Descriptive statistics were done on the variables used in the model as shown in Table 4.7.

Table 4.7: Descriptive Statistics of Variables used in the regression

Variable	N	Minimum	Maximum	Mean	Std Deviation
Pre-Obesity/ Obesity	375	0	1	.60	.490
Body Fats	375	0	1	.23	.419
Visceral Fat Percentage	375	0	1	.45	.498
Physical Activities	375	0	1	.63	.499
Exercises	375	0	1	.22	.416
Education	375	0	1	.94	.235
Occupation	375	0	1	.79	.404
Living Environment	375	0	1	.69	.464
Altered Sleep habits	375	0	1	.51	.575
Altered Diet habits	375	0	1	.34	.507
Working environment	375	0	1	.71	.456
Access to Hospital Facility	375	0	1	.33	.477
Diet	375	0	1	.61	.489
Salt	375	0	1	.03	.183
Alcohol	375	0	1	.59	.508
Tobacco	375	0	1	.40	.131
Emotional	375	0	1	.87	.337

HI	375	0	1	.74	.437
Relaxation	375	0	1	.43	.496

Source: Author's own computation.

Looking at Table 4.7, all the variables had a minimum of 0 and a maximum of 1.

The dummy variable on Pre-obesity had a mean of 0.6 ± .490 shows majority of the observations on the BMI were more concentrated towards 1, which is presence of Pre-obesity or obesity. It had a small SD of .490 (<1) which indicates that majority had a common agreement on the same. This indicates that majority of the clients studied are at risk of hypertension since they are classified as Pre-obese or obese as recommended by WHO. On Body Fats and Visceral Fat Percentage, the mean on the dummy variable was .23 and .45 respectively. This indicates that a majority of the observations on the fats were more concentrated towards 0, which is body fat less than 30% or visceral fat less than 10%. They had a small SD of 0.419 and 0.498 (<1) which indicates that majority had a common agreement on the same.

On Physical activities, the dummy variables had a Mean of 0.63, which indicated that majority of the respondents agreed that they used motorized vehicles to work. The SD of .499 indicates that majority had a uniform agreement of using motorized vehicles. This indicates that majority of the respondents are at risk of hypertension due to the reduced physical activity. On whether they exercise, the mean for the dummy variable was 0.22. This indicates that a majority of the observations on exercise were more concentrated towards 0, which is exercising more than 3 times a week. They had a small SD of 0.416, which indicates that majority had a common agreement on the same and this was protective for them.

On Education, the dummy variables had a Mean of 0.94, which indicated that an overwhelming majority of the respondents had secondary education or higher. The SD of .235 is so low indicating an uneven "split" of the values across this dummy variable. On Occupation, the mean for the dummy variable was 0.79. This indicates that a majority of the observations on occupation were more concentrated towards 1, which is seated in the office for more than 5 hours in a day. They had a small SD of 0.404, which indicates that majority

had a common agreement on the same and this increases the risk of development of NCDs, particularly Hypertension, due to the sedentary lifestyle.

The dummy variable on Living environment had a mean of 0.69 ± SD.464 shows majority of the observations were more concentrated towards 1, which is Informal/Low-middle income areas. It had a small SD of 0.464 which indicates that majority had the similar response. On whether they had noted altered sleep patterns over the last 2 weeks, there was a mean of 0.51 ± SD 0.575. This means that about half its observations were equal to 0, had not noted any changes, while a little more than half had noted a change in their sleeping habits were equal to 1. They had a small SD of 0.575 which indicates that majority had a common agreement on the same. On whether they had noted altered eating habits over the last 2 weeks, the majority denied noting any changes in their sleeping habits, with a mean of 0.34 ± SD 0.507 which indicates that majority had a common agreement about having no diet habit changes. The dummy variable on working environment had a mean of 0.71 ± SD.456 shows majority of the observations were more concentrated towards 1, which is Presence of Mental illness (Stress/Anxiety/Depression). The small SD of .456 indicates that majority of the respondents had a common agreement on whether they were stressed, depressed or anxious. The informal living conditions, presence of altered sleep or eating habits and the presence of Mental illness are indicators of risk of hypertension.

However, the dummy variable on Access to Hospital Facility which was measured using the payment mode in accessing Healthcare had a mean of 0.33± SD 0.477. This indicates that a majority of the observations were more concentrated towards 0, which is payment using Insurance or other, and Not Out of Pocket using cash mode. They had a small SD of 0.477, which indicates that majority had a common agreement on the same and this was protective for them because it increased their access to healthcare early enough and reduced their stress levels.

On Diet, the dummy variables measured the number of servings of Deep-fried, Sugared and High Fat foods per week. The dummy variable had a mean of 0.61 ± SD 0.489, which pointed out that majority of the clients under study agreed that they had more than 2 servings of the deep-fried, Sugared and High Fat foods per week. The SD of .489 points out that majority uniformly agreed on the same, indicating therefore that majority of the clients

under study are at risk of hypertension due to the type of diet eaten. On whether add salt to already cooked food or use sauces rich in salt, the mean for the dummy variable was 0.03. This indicates that a majority of the observations on uncooked salt intake were more concentrated towards 0, which is < 2 servings per week. They had a small SD of 0.183, which indicates that majority had a common agreement on the same and this was protective for them.

On ever having consumed any liquor such as beer, wine, spirits, the dummy variable had mean of 0.59 ± SD 0.508, this indicates that majority of the respondents had consumed one type of alcohol or other, such as beer, wine, spirits, it had also a very small standard deviation which indicates that majority had a common agreement on the same. On whether they smoke or use Tobacco products the dummy variable had a mean of 0.40 ± SD 0.131 which indicates that majority of the clients do not smoke or use tobacco products. The SD of 0.131 indicates that majority of the respondents had a similar response that they do not smoke or use tobacco. This indicates that majority of the respondents have reduced chances of having hypertension.

The Emotional Disposition was measured as a dummy variable and had a mean of 0.87 ± SD 0.337 which indicated that an overwhelming majority of the respondents were Usually Unhappy. This had a very small standard deviation which indicates that respondents had the similar response. On the dummy variable of how their health had impacted their capacity to work or triggered absenteeism from events they enjoy in the past 4 weeks, had mean of 0.74 ± SD 0.437, which indicates that for the last 4 weeks majority of respondents' wellbeing affected their aptitude to work or instigated absenteeism from activities in a moderate and above level, it had a very small standard deviation which indicates that respondents had the similar response. On the dummy variable of how frequently they set time aside for Relaxation, there was a Mean of 0.43 ± SD=0.496, which indicates that majority of respondents relaxed daily or often. it had a very small standard deviation which indicates that respondents had the similar response.

4.5.2 Discussion of the Regression Results

The second objective was to examine the socio-demographic characteristics of Non-Communicable Diseases affecting the millennials, attending clinics at Mater Misericordiae

Hospital. This was achieved by use of multiple linear regression and the Probit model was generated based on the coefficients (estimates) of each of the independent variables. Results were processed, and many estimates were compared to regression equation by Springer, Boston MA (1997). These results are displayed in table 4.8

Table 4.8: Marginal Effects of the Socio-demographic characteristics of Non-Communicable Diseases affecting the millennials

Parameter	Coefficient	Std. Error	Z	P value	95% Level of Confidence.	
					Lower	Higher
Pre-Obesity/Obesity	-0.047	0.019	-2.474	0.027	0.406	0.794
Body Fat	-0.130	0.262	-0.496	0.077	-0.032	0.492
Visceral Fat	0.618	0.231	2.675	0.001	0.219	0.681
Physical Activities	-0.378	0.188	-2.011	0.001	0.442	0.818
Exercises	-0.515	0.239	-2.301	0.006	-0.019	0.459
Education	0.862	0.426	2.023	0.013	0.494	1.386
Occupation	0.363	0.173	2.098	0.006	0.517	1.063
Living Environment	0.589	0.232	2.538	0.022	0.458	0.922
Altered Sleep habits	-0.321	0.173	-1.855	0.067	0.337	0.683
Altered Diet habits	-0.361	0.175	-2.063	0.000	0.165	0.515
Working environment	0.156	0.282	0.553	0.060	0.428	0.992
Access to Hospital Facility	0.438	0.217	2.018	0.003	0.093	0.567
Diet	-0.024	0.011	-2.182	0.002	0.399	0.821
Salt	-0.060	0.028	-.2.143	0.007	-0.391	0.451
Alcohol	-0.032	0.184	-0.171	0.069	0.406	0.774
Tobacco	0.160	0.079	2.025	0.029	0.321	0.479
Emotional Disposition	0.304	0.144	2.111	0.001	0.606	1.134
HI	-0.492	0.229	-2.148	0.006	0.511	0.969
Relaxation	0.460	0.204	2.254	0.036	0.226	0.634

Chi Square	H_o: Statistics based on individual cases differ from statistics based on aggregated cases Chi Square 6.084; df[a] 114; Sig. 0.002
Pseudo R Squared	(0.580)

Source: Author's own computation.

The Chi Square and Pseudo R^2 were tested to check the General fit of the model. To test the Goodness – of - Fit for the Probit model, the chi-square test was used since the data was binary (categorical) and results were displayed as shown in table 4.8. The chi-square test significant value had p-value < 0.05 (Pearson, 1900) which indicates that we reject the tested statement that Statistics based on individual cases differ from statistics based on aggregated cases. Hence it thus indicates that statistics based on individual cases during determination of hypertension represents the aggregate cases.

The Pseudo R^2 indicates that the model explains 58% of the variability of the response data.

Looking at the Z values which should be greater than 2 and the corresponding p values which are <0.05 (Pearson, 1900), all the variables are significant except for Body Fat, Working Environment and Alcohol on determining the risk to hypertension.

From table 4.8 the model was projected to estimate hypertension based on the studied determinants as per the model specification. The marginal effects of each of the determinates of hypertension were generated using the estimates or coefficients of each of the determinants on hypertension

Based on table 4.8, Pre-Obesity/obesity had a negative marginal effect of – 0.047. It can be interpreted as having a BMI > 25 reduces the chances of developing hypertension by 4.7%, assuming all other factors are held constant. This contradicts studies done that clearly show that being overweight or obese increases the risk of hypertension (Abbott & Sim, 2010). Body fat had a negative marginal effect of -0.13 indicating that the presence of body fat has a likelihood of reducing the chances of developing hypertension by 13%. Visceral Fat Percentage on the other hand had a Positive marginal effect of 0.618 indicating that the presence of visceral fat increased the likelihood of hypertension by 61.8%. This confirms the study done by Abbott and Sim, which showed that being overweight or obese and hence high fat content increases the risk of hypertension (Abbott & Sim, 2010). Although the BMI

and Body fat are seen to have a negative effect, Visceral fat Percentage is a more serious marker of risk of hypertension, because this is the fat that deposits on the vital organs – such as the Pancreas, Liver, Kidney, Blood Vessels and around the heart. This is more dangerous because the higher it is, the more it poses a high risk of sudden cardiovascular events like heart attacks, stroke etc. (Hiroyuki Nagaretani et.al, 2001)

Physical activities which were described in our model as the activities incorporated within one's daily activities, indicated that the presence of physical activities had a likelihood of reducing the hypertension by 37.8%. Scheduled Exercise can also be interpreted as the higher the exercise, the lower the risk of developing hypertension by 51.5% with other factors held constant. These two parameters concur with the studies that show that Physical inactivity was found to be the underlying causative agent in 1.9 million deaths as well as causing 22% of hypertension and its complications e.g. ischemic heart diseases (WHO, 2003).

The lower the education level, in our case, Education less than Secondary school increases the likelihood of hypertension by an overwhelming 86.2% when other factors are all held constant. These results concur with the findings of the KDHS 2008/2009 which showed that men with secondary education or higher have a lower tendency to be involved in NCD causative risk factors such as smoking than men with lower education (Calverton & Maryland, 2008) and hence leading to reduction of effects of smoking on causing hypertension.

Occupation, Working Environment had Positive marginal effects of 0.363 and 0.156 respectively. This indicates that when all other factors are held constant, occupation and working environment would increase the likelihood of developing hypertension by 36.3% and 15.6% respectively. These results concur with the findings of Solar and Irwin (2010) who found out that occupation directly determines environmental and work exposures such as physical demand. Some occupation determines food consumed, involvement in physical activities, smoking and excessive use of alcohol. The Living Environment also had Positive marginal effects of 0.589. This indicates that living in Informal/Low-middle income areas increases the risks of developing hypertension by 5.9% if all other factors are held constant. This concurs with the study done in Mombasa that showed that, the poorer the quintile, the

worse the health profiling as far as risk factors were concerned, compared to their privileged counterparts (Tawa, Frantz, & Waggie, 2011).

Altered Sleep habits indicated that changes in sleep patterns reduces the chances of developing hypertension by 32.1% if all other factors are held constant. This contradicts studies that show that sleep is beneficial to the body, therefore would reduce the risk of hypertension. The findings also contradict the fact that over time, a lack of sleep affects the body's ability to regulate stress hormones, leading to high blood pressure (Cirelli C, et al., 2017). Altered Diet habits as well as Diet itself also indicated that changes in one's eating habits reduced the likelihood of developing hypertension by 36.1% when all other factors are held constant, while the intake of fatty foods, Deep fried Foods, Sugared and High Fat reduced the chances of developing hypertension by 2.4% when all other factors are held constant. These findings contradict the study that shows inappropriate diet leads to metabolic changes leading to increase in BP, unfavourable cholesterol, increased resistance to insulin and increased chances of complications (WHO, 2003). Salt also indicated a protective effect indicating that adding salt or salty sauces to already cooked food in more than 2 servings per week reduces the chances of developing hypertension by 6% when all other factors are held constant. This is contrary to the study by WHO that indicated Salt is harmful to one's health and higher intake of salt increases the risk of Hypertension. Daily recommended salt intake is 5g (WHO, 2002).

Alcohol intake was also studied in our model and the result indicates that the likelihood of developing hypertension is reduced by 3.2% upon alcohol intake when all other factors are held constant. The Z value of Alcohol was found to be $Z < 2$ and the p value > 0.05 and hence alcohol was not found to have a significant impact on determining the risk to hypertension. This finding contradicts multiple studies such as study by Mundan et al., (2013) who found that increased alcohol intake increases alcohol within the blood stream hence increases risk of hypertension by altering cell membrane and allowing more calcium to enter, reducing sodium absorption, augmenting constriction of the blood vessels by affecting certain hormones and neurotransmitters, as well as inhibiting endothelium dependent vasodilatation. It also contradicts WHO Factsheet in September 2018 showing that 5.1 % of the global infirmity and injury load boils down to harmful use/abuse of alcohol, as evaluated by DALYs. Consumption of Alcohol is the root source of death and

disability much earlier in life with about 13.5% of morbidities and mortalities among the 20–39-year-old age groups being alcohol-attributable (WHO on Alcohol, 2018).

Tobacco was found to have an impact on determining hypertension by increasing its likelihood. Smoking or using tobacco in whichever form increases the chances of developing hypertension by 16%, assuming all other factors are held constant. This concurs with the study by O'Donnell et al. (2010) who found out that 10% of deaths from stroke (a complication of the NCDs) are due to smoking (Stroke association, 2013). In a study in 22 countries smoking contributed to 18.9% of the stroke cases, a complication of Hypertension.

Emotional disposition was studied, and the response seen with the percentage of individuals who indicated they were usually unhappy. Emotional disposition of always being unhappy increases the likelihood of developing hypertension by 30.4% if all other factors are held constant. Access to Hospital Facility was studied as inaccessibility to healthcare as measured by payment using cash, that leads to stress caused upon patients on out of pocket payment method would increase the likelihood of developing hypertension by 43.8% if all other factors were held constant. This concurs with the study that indicates that stress is known to have both the direct and indirect repercussions on an individual by influencing and encouraging harmful and risky behaviors attributed to high blood pressure (WHO, 2002).

Health Impact on Activities as studied found that being absent moderately and above from activities/work because of one's health reduced the risk of developing hypertension by 49.2% if all other factors were held constant. Relaxation was also studied in our model. The Absence of relaxation makes the individual tenser and/or less relaxed, increased the likelihood of hypertension by 46% if all factors were held constant. These two concur with Grossman's Theory of Health Capital which indicated that relaxation improved the individual's health stock, making them invest more on their health (Grossman, M.,1972).

5 CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the conclusion, and recommendations of the study as per the research objectives. Following the discussion of the results of the study and after comparing them with the work already published by other researchers as per the literature review of this study, conclusions were drawn and Proposals for future are also given. This section narrowed down to the findings of the two objectives of this study which included to determine the Biometric parameters (BMI, Body fat, Visceral Fat and Blood Pressure) of Millennials undergoing Primary care treatment at the Mater Misericordiae Hospital and to examine the socio-demographic characteristics of Non-Communicable Diseases affecting the millennials, attending clinics at Mater Misericordiae Hospital. They were further discussed in subsections below.

5.2 Conclusion

From these findings, the study thus concludes that many of the millennials are living risky lifestyles which is accompanied by smoking, taking alcohol, physical inactivity, not doing exercise and this can lead them to be at risk of getting NCDs, notably, high blood pressure.

The study also concludes that socio-economic characteristics of an individual has a relationship that can lead to reduction or increased chances of having hypertension. Thus, should also be kept into consideration so that the patients are advised accordingly so that they can reduce chances of being hypertensive.

The study thus concludes that all the factors that were modeled by Springer, Boston MA (1997) to determine hypertension were found to have an impact either contradicting or concurring with the results of Springer, Boston MA, (1997).

5.3 Recommendations

From the findings, and knowing that Hypertension is a silent killer, the following were recommended

i. Millennials must monitor their body Biometric parameters from time to time and get regulatory measures to be taken as per the advice from doctors.

ii. The clients should be given more information on how to take care of themselves by the doctor based on their biometric and social-demographic characteristics as they seek medical help from the hospitals.

iii. Clients should be advised to stop risky lifestyles such as using alcohol, smoking, set aside times for relaxation as well as avoid or manage mental illness (Stress, Depression or Anxiety).

iv. Millennials should also be encouraged to get involved in physical activities, exercises and not to be sitting most of their time even if they are at work.

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APPENDIX 1: PARTICIPANT INFORMED CONSENT EXPLANATION AND FORM.

I, Dr Peris Wambui Kagotho, is conducting a study on the rising incidence of Non-communicable diseases among the young population in Kenya, with a focus on the rise of Bio-metric Parameters, among the millennials in Kenya as surveyed during the triages conducted by Mater Misericordiae Hospital.

I am requesting you, to be in the research study. The purpose of this consent form is to give you the information you will need, to help you decide whether to be in the study or not. You may ask any questions about the research, possible risks and benefits, your rights as a volunteer and anything else. When you finish you can decide if you want to be in the study or not. This process is called 'informed consent' we will give you a copy for your own records.

Purpose and benefits

The purpose of the study is to get information on the various risks factors and the conditions of daily life currently present among the young that will lead to an increased burden to the healthcare system and increased cost in accessing healthcare as recommended by healthcare workers if left status quo. The study will last approximately three months, we shall talk to you once, but you are welcome to come back anytime if you have additional questions. You may not directly benefit from taking part in this study, but the information will help health managers on the issues related to NCD's in this country.

Procedures

The study will involve screening to see if you can participate or not. This will be followed by an interview using a questionnaire and finally collection of your biometrics such as your Height, Weight and Blood Pressure

We shall not take any blood, urine or any sample from you.

Participation in this survey is voluntary and you can choose not to answer any individual question or all the questions. We however hope that you can participate in this study, since your views are very important.

Risks stress or discomfort

We shall be asking you sensitive information about yourself and your mental/social wellbeing. This may be uncomfortable for you.

Confidentiality

The information collected will be kept in a secure place, only people involved with the study will have access to the information. The information you will give will be treated as private and confidential. Your name will not appear in any of the papers or documents related to the research.

You may refuse to participate or stop answering questions at any time during the study without penalty. In case you refuse to participate, you will not be denied services in this facility and you will continue to receive care.

You will not be paid any money to participate in this study.

Contact

If you have questions about my rights as a research subject, you can call:

The Mater Misericordiae Hospital, Standards and Ethics Sub-Committee.

Or the principle investigator:

Dr Peris Wambui Kagotho; mobile number 0722319395

APPENDIX 2: APPROVAL TO CARRY OUT RESEARCH AT MATER HOSPITAL

Mater Misericordiae Hospital
Under the Sisters of Mercy

P. O. Box 30325 - 00100
Dunga Road, Nairobi, Kenya
Telephone: (254) (020) 6903000
Mobile Lines: 0719 - 073000, 0732 - 163000
Fax: (254) (020) 6534289
Email:inform@materkenya.com
Website: www.materkenya.com

17th October 2019

Our Ref: MMH/DMS/VOL.2019/037

Dr. Cohnrad Ouko,
The Mater Misericordiae Hospital,
Nairobi.

Dr Peris Kagotho,
The University of Nairobi,
Kenya.

Dear Dr. Ouko and Dr. Kagotho,

RE: PERMISSION TO CONDUCT A STUDY ON DETERMINANTS OF NON-COMMUNICABLE DISEASES AMONG THE MILLENIALS IN KENYA.

We acknowledge receipt of your request for permission and assistance to conduct a research study on 'Determinants of Non-Communicable Diseases among the Millenials in Kenya.'

Standards & Ethics Sub-Committee of The Mater Misericordiae Hospital, has reviewed your request as entitled above, and found it acceptable.

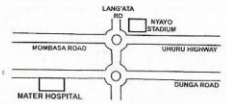
You are hereby allowed to proceed with your research but **MUST** submit a copy of proposal and findings for inclusion in our inventory.

I wish you well.

Thank you.

Yours Faithfully,
FOR: THE MATER MISERICORDIAE HOSPITAL

Dr. Andrew Ndonga
CHAIR, STANDARDS AND ETHICS SUB COMMITTEE



APPENDIX 3: STEPwise QUESTIONNAIRE

Social Demographic information

1. Sex (*Record male or female as observed*) ☐ Male ☐ Female
2. What is your Age? _____ Years
3. Height? _____ Centimeters (*Record figure as measured)*
4. Weight? _____ Kilograms (*Record figure as measured).*
5. Body Fat? _____ Percent (*Record figure as measured)*
6. Visceral Fat? _____ Percent (*Record figure as measured).*
7. Blood Pressure? _____ mmHg (*Record figure as measured)*
8. What is the highest level of education you have completed?

    a) ☐ Primary School

    b) ☐ Secondary School

    c) ☐ Tertiary College (Certificate/ Diploma)

    d) ☐ University (Bachelor's) Degree

    e) ☐ Post-Graduate Degree

    f) ☐ Doctorate (PhD)

9. Which of the following best describes your **main work** status over the past 12 months?

    a) ☐ Government/ Non-government employee

    b) ☐ Self-employed

    c) ☐ Volunteer/ Nonpaid internship

    d) ☐ Student

    e) ☐ Homemaker

f) ☐ Unemployed (able to work)

g) ☐ Unemployed (unable to work)

10. Which of the following best describes your main work over the past 12 months?

a) ☐ Manual Work

b) ☐ Office work seated more than 5 hours a day

c) ☐ Office work seated less than 5 hours a day

d) ☐ Field Work

11. How do you get to your workstation?

☐ Walking ☐ Cycling ☐ Motor vehicle

Your health/ Social Behavior

12. Do you exercise regularly or take part in a physical exercise program?

☐ Yes, daily

☐ Yes, more than 3 times a week

☐ Yes, fewer than 3 times a week

☐ No

13. Do you smoke or use Tobacco products?

☐ Yes ☐ No

14. When was the last time you smoked or used any tobacco products? *(cigarettes, chew, snuff, pipes, cigars, vapor cigarettes)*

☐ Today ☐ Last week ☐ Last month

☐ Last 3 months ☐ Last year ☐A year to 5 years ago

☐ Longer than 5 years ago ☐ Never

15. Have you **ever** consumed any alcohol such as beer, wine, spirits?

☐ Yes ☐ No

16. Have you ever been treated for drug or alcohol abuse?

☐ Yes ☐ No ☐ Not Applicable

17. In the past 3 months, how many times did you go to the hospital?

☐ 0 ☐ 1 ☐ 2 ☐ 3 or more

18. A) Did you pay for the services?

☐ Yes ☐ No

B) Which mode of payment did you use?

☐ Cash ☐ Insurance ☐ Other (Specify)

19. In the past 6 months, how many times have you had unplanned overnight stay as a patient in a hospital?

☐ 0 ☐ 1 ☐ 2 ☐ 3 or more

20. Has your doctor recently told you that you need to lose weight?

☐ Yes ☐ No

<u>Your Diet</u>

21. In the past 7 days, how many times did you eat fruits and vegetables?

☐0 ☐1-2 ☐3 ☐4+

22. In the past 7 days, how many servings of fruits and vegetables did you typically eat each day? *(1 serving = 1 cup of fresh vegetables, 1/2 cup of cooked vegetables, or 1 medium piece of fruit.)* ☐0 ☐1-2 ☐3 + ☐ N/A

23. In the past 7 days, how many servings of high fiber or whole grain foods did you typically eat each day? *(1 serving = 1 slice of 100% whole wheat bread, 1 cup of whole-grain or high-fiber ready-to-eat cereal, 1/2 cup of cooked cereal such as oatmeal, or 1/2 cup of cooked brown rice or whole wheat pasta.)*

☐ 0 ☐ 1-2 ☐ 3-4 ☐ 5+

24. In the past 7 days, how many servings of fried or high-fat foods did you typically eat each day? (Examples include fried chicken, fried fish, bacon, French fries (Chips), Crisps, doughnuts, Mandazis, creamy salad dressings, and foods made with whole milk, cream, cheese, or mayonnaise.)

☐ 0 ☐ 1 ☐ 2-3 ☐ 4+

25. In the past 7 days, how many sugar-sweetened *(not diet)* beverages did you typically consume each day (e.g. Soda, Juices, Concentrates etc.)?

☐ 0 ☐ 1 ☐ 2-3 ☐ 4+

26. How often is **salt, salty seasoning or a salty sauce added** in cooking or preparing foods in your household?

☐ Daily

☐ More than 3 times a week

☐ Fewer than 3 times a week times a week

☐ None at all

☐ Don't know

27. How often do you add salt or a salty sauce such as soya sauce to your food right before you eat it or as you are eating it?

☐ Daily

☐ More than 3 times a week

☐ Fewer than 3 times a week times a week

☐ None at all

28. On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner.

    ☐ Daily

    ☐ More than 3 times a week

    ☐ Fewer than 3 times a week times a week

    ☐ None at all

29. In the past 2 weeks, have you experienced a change in the amount you normally eat, either poor appetite or overeating?

    ☐ Yes ☐ No

Mental Health

30. In the past 2 weeks, have you felt stressed or anxious?

    ☐ Yes ☐ No

31. In the past 2 weeks, have you had little interest or pleasure in doing things that you normally like to do?

    ☐ Yes ☐ No

32. In the past 2 weeks, have you been feeling downhearted, depressed or "blue" more than usual?

    ☐ Yes ☐ No

33. In the past 2 weeks, have you experienced a significant change in the amount of sleep you normally sleep, either trouble getting to sleep or sleeping too much?

    ☐ Yes ☐ No

34. How would you describe your living environment?

☐ Informal Settlement/Slum

☐ Low – Middle Income Areas

☐ Upper - Middle Income Areas

☐ High Income Areas

35. What is your emotional Disposition?

☐ Generally Happy ☐ Sometimes Happy ☐ Usually Unhappy

36. During the past 4 weeks, how has your health impacted your ability to work or caused you to be absent from activities you enjoy?

☐ Not at all ☐ A little bit ☐ Moderately

☐ Quite a bit ☐ Extremely

37. How frequently do you set time aside for Relaxation?

☐ Daily ☐ Often ☐ Seldom Relaxed

☐ Usually Tense ☐ Always Tense

38. Who completed this survey form?

☐ Myself ☐ Research Assistant ☐ Friend

39. What is your primary Language?

☐ English ☐ Kiswahili ☐ Other _____

Thank you for your Participation in this study.