

**ANALYSIS OF THE RELATIONSHIP BETWEEN HOUSEHOLD
INCOME LEVELS AND HEALTH STATUS IN ZANZIBAR
A CASE OF URBAN DISTRICT**

By

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**A Dissertation Submitted in Partial Fulfillment of the Requirements for the
Degree of a Master of Science in Economic Planning and Policy (MSc EPP) of
Mzumbe University**

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled **Analysis of the Relationship between Household's Income Levels and Health Status in Zanzibar**, in partial fulfillment of the requirements for award of the Degree of Master of Science in Economic Planning and Policy of Mzumbe University.

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DEDICATION

This dissertation is dedicated to my family for their prayers and encouragement for the success of my studies.

LIST OF ABBREVIATIONS

BMI	Body Mass Index
CVDs	Cardiovascular Diseases
DALYs	Disability Adjusted Life Years
GNI	Growth National Income
HT	Hypertension
NCDs	Non Communicable Diseases
NIMR	National Institute for Medical Research
NHIS	National Health Interview Survey
OLS	Ordinary Least Square
RGoZ	Revolutionary Government of Zanzibar
SES	Social Economic Status
SSA	Sub Sahara African
SURE	Seemingly Unrelated Regression Equations
TDHS	Tanzania Demographic and Health Survey
URT	United Republic of Tanzania
VAD	Vitamin A Deficiency
WB	World Bank
WHO	World Health Organization
YPLL	Years of Potential Lost Life
YLL	Years of Lost Life

ABSTRACT

The study analyses relationship between household's income levels and health status in Zanzibar. Specifically, the study investigated the relationship between household's income and morbidity, mortality and life expectancy respectively. The study used morbidity, mortality and life expectancy as health proxies rather than using health index as it would narrow the scope of investigation. Income and other socioeconomic determinants like age, gender, marital status, education, health care accessibility, number of meals and BMI were used as predictors of health status.

To achieve the objective of the study, relevant cross-sectional primary data were collected from 96 respondents in urban district. The data collected were analyzed and relevant descriptive statistics were reported. Seemingly Unrelated Regression was employed as the method of estimation. Post regression tests such normality tests, correlation matrix, endogeneity test and Breusch-Pagan test were performed to avoid spurious regression.

The findings show that, household's income was found to have positive correlations with health status since it was estimated to increase by 41% from one unit increase of income of the rich compared to the income of the poor households as was expected holding other variables constant.

Based from the findings, the study concludes that, variations of socioeconomic status in relation to lifestyles are the main predictors of health status. Since the rich suffer due to their unhealthy behaviours and the poor due to their poverty. Therefore, the government has to minimize income inequality by increasing income distributions and asset ownership to enable the poor to manage medical services and nutritious food for a healthy life. In addition should also emphasize the importance of changing lifestyles via national wise sports like SHIMIWI, UMISSETA, UMITASHUMTA and BAMATA targeting to minimize tobacco and alcoholic intake, insisting on physical activity, proper diet and natural food intake for healthy and productive society and not only targeting the rich but also the poor households.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The increased global income from 19th century has led to greater changes in health status of the world. A number of recent studies on psychology and health economics show that, increasing income is thought to improve health outcomes. McKeown (1976) and Fogel (1996) argued that improvement in longevity in the 19th century was not driven merely by advancement in medicine or public health, but mainly by improvement of nutrition, largely driven by higher income. Though, many health economists and psychologists agreed that, while the first moment of income is protective both at the household and community level toward positive health outcome, the second moment is destructive leading to numerous health hazards (Benzeval et al, 2000).

Studies on the relationship between income and health demonstrate that, during the second half of the 20th century, health conditions around the world improved more than in all previous history. In 2013, life expectancy at birth for both sexes globally was 71 years, ranging from 62 years in low income countries to 79 years in higher income countries (WHO, 2013). However, the world transitions brings higher vulnerability on health risks associated with increase of income over the globe that accelerate the rate of morbidity and mortality due to unhealthy behaviours mainly associated with tobacco and alcoholic intake, poor eating styles and physical inactivity. In both developed and developing countries, unhealthy behaviours are the major source of many health problems particular relating with HIV/AIDS and cardiovascular diseases including heart diseases, cancer, stroke, diabetes, obesity and chronic respiratory diseases. These diseases are leading on causing illness, disability and deaths (WHO, 2010). According to WHO, (2010) 3 million women and 2.5 men die from stroke worldwide annually. Stroke is claimed to be the third most common source of death in developed countries exceeded only by coronary heart disease and cancer. In 2012 reports of the WHO shows that, 8.2 million people worldwide died from cancer disease and 32.6 million people living with cancer worldwide.

Moreover, the high level of poverty in Sub Sahara Africa (SSA), increase the risk of morbidity and mortality due to poor living conditions. Since severe poverty tends to erode people's physical health through the effects of poor nutrition and undernourishment, poor sanitation and hygiene, illiterate and inaccessibility of quality health care. Because of their poverty therefore, lower income families are more likely to experience a greater incidence of variety of illness, long hospital stays, mental health problems, lower school achievement and early drop out (Raphael, 2004).

According to the World Bank (2013) it is claimed that a new infant born in SSA has only 56 expected years of life to live. If the same infant were born in higher income countries of the world during the same period, however, it would expect to live more than 77 years compared to 56 years in SSA. This has been further worsened by poverty and inequality leading to low level of living standards. For instance, according to WB (2014), lower income countries including Tanzania and Bangladesh have very low health expenditure per capita averaged of only \$67 per person compared to higher income countries like United State, Japan and German which have an average health per capita of \$6,270 per person per annual. It appears however that, in SSA, health production is seen as costs and burden rather than investment contrary to the well known psychologist Grossman (1972) idea that, health is a capital to be invested for economic development. Grossman suggests further that, the higher energetic society, the higher the times for production necessary for economic growth. Hence, he demonstrates that, unhealthy community or individual tend to reduce the amount of times and labour to be spent on producing earning and commodities leading to its poverty. Since, lower income groups suffer as a consequence of their higher diseases risks due to limited access to medical care and the rich suffer due to their unhealthy behaviours.

In East Africa, though cardiovascular data are a little scarce, but demographic transitions are considered to be the main source of unhealthy behaviors in causing millions of HIV/AIDS and cardiovascular cases in the region (Cardiol, 2011). According to Cardiol (2011), the negative impacts of modern lifestyles vary over the

region between East African countries in causing both morbidity and mortality. In Kenya, cardiovascular diseases contribute more than 13% of total deaths preceded by Tanzania. Over the region, Tanzania including Zanzibar is leading in having the highest rate of morbidity and mortality caused by cardiovascular diseases (CVDs) followed by Kenya and Uganda. The country had 14,700 deaths of coronary heart diseases and 16,115 of stroke in 2002 compared to 13,661 and 14,843 deaths in Kenya , 10,163 and 11,043 deaths in Uganda respectively (WHO, 2014).

However, it is claimed that, the major economic and social reforms in Tanzania and Zanzibar from 1980s to 1990s in reviving the country's economy led to both positive and negative consequences on health status (Savage et al, 2014). Easily accessibility of medical care, vaccination as well as the scattered health research institutes over the country reduced the rate of morbidity and mortality from infection diseases like malaria, undernourishment diseases, yellow fever, cholera and diarrhoea that were leading in causing illness and deaths before 2000s. According to Tanzania Demographic Health Survey (2010), infant and child mortality rate dropped from 96 and 53 death per 1,000 live births in 1996 to 51 and 32 deaths in 2010 as well as life expectancy increased from 51 years in 1990 to 61 in 2014 due to the acceleration of economic growth on the average of 6.4 annually since at the end of 1990s with \$172 per capital in 1990 to \$695 in 2013 (WB, 2014).

On the other hand, these reforms altered people's lifestyles almost to unhealthy behaviours that increase the risk of illness and fatalities among the community in Zanzibar and Tanzania in general. In Zanzibar, diseases that were once considered rare or called "diseases of the rich" during 1990s such as hypertension, coronary heart diseases, cancer, stroke, diabetes, obesity, HIV/AIDS and chronic respiratory diseases are now considered a normal phenomenon (RGoZ, 2009). The wide spread of cardiovascular diseases in the islands has been identified by the Ministry of Health as a major serious health hazard due to the higher number of morbidity and mortality cases especially in Unguja Islands. The variation of these health outcomes made the relationship between income and health status uncertain. This is what made the researcher, to conduct this study to investigate such relationship.

1.2 Statement of the problem

There is a theoretical and empirical basis to the argument that health and economic growth are affecting each other as postulated by (Grossman, 1972). Healthy community produce more due to their higher supply of energetic and skilled labour. The increase of income enables people to manage and access goods and services necessary to improve health status. In Tanzania, the increase in per capital income from \$ 695 in 2013 which is four times higher than \$172 of 1990, enables households to reduce the rate of illness and deaths particularly from those related with infection diseases like malaria, cholera, diarrhoea and undernourishment diseases, hence people are able to access nutrient diet, medical care facilities, health skills, safe water, sanitation and hygiene (Savage et al, 2014 and RGoZ, 2009). These led to the increase of country life expectancy to 61 years in 2013 from 43 years soon after the revolution and the union between the People's Republic of Zanzibar and Tanganyika in 1964 (TDHS, 2010).

According to Benzeval et al (2000), the relationship between income and health is not clearly understood. Since as the national and individual income is prospering and standard of living is rapidly accelerating since 1990s, morbidity and mortality of both lower and higher income groups are also increasing at an unimaginable rate. This brings a huge confusion about the relationship between income and health status despite the fact that higher income people are favorable to better health. But evidence suggests that, higher income people are also suffering with many health problems particular relating to HIV/AIDS and cardiovascular diseases like coronary heart diseases, cancer, strokes, obesity, diabetes, HT and chronic respiratory diseases.

According to WHO (2011), CVDs is the second in causing deaths in both Tanzania mainland and Zanzibar preceded by infections and HIV/AIDS. The data show that the total death of CVDs in combination stood at 72,460 deaths in the year of 2011. Deaths from stroke is leading by 21,973 in the country followed by 19,083 deaths of heart diseases, 8,429 deaths from diabetes, 8,056 deaths by cancer, 6,809 deaths by lung diseases, 4,355 deaths by kidney diseases and 3,755 deaths by hypertension. Hence, evidence reveals that, most of the higher income groups and the poor in both

developed and developing countries suffer from CVDs in different proportions. This brings misunderstanding of the actual relationship between health and income level. It is not clear whether the relationship is positive, negative or none. Thus, due to this ambiguity, made the researcher to conduct this study in order to investigate the relationship that existed between income levels and health status in Zanzibar.

1.3 General objectives

This study was intended to examine the relationship between household income levels and health status in Zanzibar.

1.3.1 Specific objectives

The researcher under this study was guided by the following specific objectives:

- i. To investigate the relationship between morbidity and household income.
- ii. To examine the relationship between mortality and household income.
- iii. To investigate the relationship between life expectancy and household income.

1.4 Research hypothesis

The study was intended to test the following hypotheses.

- i. Ho: The higher the morbidity the lower the household income.
- ii. Ho: The higher the mortality the lower the household income.
- iii. Ho: The lower the life expectancy the lower the household income.

1.5 Significance of the study

The finding of this study will form a major input to macroeconomic planners, policy and decision makers on improvement of health status in Zanzibar. It will be an additional contribution to a few studies that have been done in the past to analyze the relationship between income levels and health status among households.

Additionally, the study will add knowledge, attitude and practice about the causes and consequences of cardiovascular, infection diseases and HIV/AIDS among adults

and children to researchers, academicians and health activists interested in the subject matter in providing recommendations and suggestions in improving health promotion strategies toward combating the rampant of those diseases in Zanzibar and Tanzania in general.

The methodology of the study used will also provide a light and direction to other researchers and health activists who will conduct the same or similar studies on determining proper research techniques which have not been used for the purpose of observing the real relationship between income and health status in the country for reliable and valid results.

1.6 Scope of the study

The study was conducted in Zanzibar, where the relationship between household's income and health status was analysed. The urban district was selected where it encompassed six wards which were Mji Mkongwe, Mlandege, Mwanakwerekwe, Kiembesamaki, Mpendae and Jan'gombe. Five Shehia from each ward were selected to be involved in the study. The district was purposively selected due to the existence of higher income variations necessary to serve the purpose of the study on analyzing their effects of income on household's health status.

1.7 Ethical consideration

Ethical issues were highly observed. The study observed human rights and country's policies, rules and regulations during the whole process of the study. The respondents were informed that, the study was only for academic purpose and were assured that, the information they would provide will be treated confidentially. Furthermore, respondents were given options to withdraw from the study at any time and they were not forced to write their names on the questionnaires.

1.8 Organization of the dissertation

The study comprises of six chapters. Chapter one includes the introduction, statement of the problem, objective of the study, scope and significant of the study, chapter two includes theoretical and empirical literature reviews with conceptual framework. Chapter three contains research methodology which includes research design, study area, study population, sample size and sample techniques, data collection methods as well as the model used in the estimation. Chapter four describes the presentation of findings. Chapter five covers the discussion of findings. And chapter six includes the summary, conclusions and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of terms

2.1.1. Health concept

Health as defined by World Health Organization (WHO, 1990), is a state of complete physical, mental and social well being and not merely the absence of disease or infirmity. In the words of Anne Case (2001) health is primarily measure of each person's ability to do and become what he wants to become. However, health scholars agreed that health consists of physical and mental health (Deaton, 2003). In this study, the term health is defined as a combination of morbidity, mortality and life expectancy of the studied community.

2.1.2 Health index

According to WHO (2014) health index is used in assessing inequalities in health determinants and outcomes as well as for comparisons. It includes numerous health indicators individually or in a set used in measuring health status of populations. It is commonly, known as Urban Health Index used to measure not only intra-urban health inequalities but also inter-city or nation comparisons. It conventionally adopts a method used by the Human Development Index in its calculation but largely involve health determinants and it ranges from 0 to 1.

Health index in this study has been defined as a prime indicator in form of a ratio used to measure health status of individual or community calculated from the combination of several health determinant's ratios. A good example of health index component is body mass index (BMI). However, in this study, BMI has been used as one among the variable in affecting health status.

BMI is defined as a measure of whether someone is normal, overweight, underweight or obese calculated by dividing their weight in kilograms by their square of height in meters. The recommended healthy of BMI ranges are under 18.5

for underweight, 18.5 to 25 for normal weight, 25 to 30 described as overweight and over 30 BMI for obese.

$$BMI = \frac{kg}{m^2}$$

However, the WHO regards a BMI of less than 18.5 as an indicator of poor health and may show the indication of malnutrition, an eating disorder or poor diet intake together with other health problems, while a BMI equal to or greater 25 is considered overweight which is unhealthy and above 30 is considered as obese which is also an extremely risk for cardiovascular diseases like heart diseases, stroke, HT, diabetes and cancer. These ranges of BMI are categorised as follows:-

Table 2.1: BMI categories

Category	BMI = km/m ²	
	From	To
Underweight		18.5
Normal (healthy weight)	18.5	25
Overweight (unhealthy weight)	25	30
Obese (Severely unhealthy weight)	30>	

Source: Researcher's own construction, 2015

2.1.3 Health impact

A health impact to individual can be positive or negative. A positive health impact is an effect which contributes to good health and tends to have a constructive impact. For example, aspects like diet intake and physical exercises are known to have a beneficial effect on mental health and well being as making people feel healthier and better off. A negative health impact has harmful effect, contributing to ill health. For example poor eating styles, unsafe sex, excessive smoking and alcoholic intake are likely to have an adverse effect on physical health status.

2.1.4 Morbidity

Morbidity can be defined as the departure from a state of physical, mental and emotional well-being resulting from infection, illness, harm, diseases or sickness particularly where the affected person is aware of his or her circumstances. In a simple language, morbidity refers to unhealthy conditions of an

individual/community. According to the WHO (2006), morbidity rate could be measured in terms of number of persons who were ill, illnesses these persons experienced and the duration of these illnesses.

However, in this study, morbidity has been defined as a number of self reported illnesses of the household's member in the past three months.

2.1.5 Mortality

Mortality is the number of deaths by place, time and cause (WHO, 2006). Different methodologies are used in registering mortality with its underlying causes like Mortality rate, Disability Adjusted Life Years (DALYs) and Years of Potential Life Lost (YPLL) or sometime known as Years of Lost Life (YLL).

Years of Life Lost (YLL) which has been first introduced by Dempsey in 1947 noted by Thacker, Stroup, Kulis, Marks, Roy and Julie (2006), is widely used in measuring mortality by using premature mortality. Premature mortality is used to measure the total number of deaths that occur before reaching the expected number of years set. It is usually fixed by the number of life expectancy of any individual or community. In simple language, it is used to measure the total number of deaths before reached their maturity (life expectancy rate) by using years of potential life lost (YPLL) or years of lost life (YLL).

To compute the YLL, the researcher sets a reference age corresponding to the life expectancy of the population under study. In developed countries the commonly set age is 75 years written with respect to the reference age used in the calculation such as YLL(75). It can be calculated based on individual level or grouped age data by just subtract YLL of that individual or specific age group of death from the reference age. If a person dies at older age than the reference age, that person's YLL is set to zero as it affects only those who die before the reference age. It can be expressed as a percentage that is, the years of potential life lost from a specific cause of death as a percentage of the total number of years of potential life lost from all causes of deaths. To calculate the YLL for a particular population in a particular year, it just sums the

individual YLLs for all individual in that population who died in that particular year. It can be done for all cause of mortality or for specific cause of mortality.

In this study therefore, mortality has been defined as premature mortality measured by YLL from the individual calculated in a past one year. The reference age was set at 61 years as life expectancy at birth according to (TDHS, 2014).

This method is widely used in health economics particular on analyzing mortality since it verify both quantification of mortality and causes of mortality while the conventional mortality rate only describes the quantity or rate of deaths like maternity, infant and under 5 child mortality. The vivid example of study that used Years of Life Lost (YLL) on measuring mortality can be traced from the study of Julie et al (2006), who analysed the years of life lost among people died with cancer diseases in US. Another example conducted in Canada by Romeder and McWhinnie (1977) focused on analysing the causes of mortality in preparing inputs to health planners in Canada where YLL were used to measure the rate and the causes of deaths among population aged from 1 year to 70 years. Wurthwein, Gbangou, Sauerborn and Schmidt (2000) is another clear example conducted in SSA - Burkina Faso in determining the burden of diseases on fatalities where YLL was used as a tool in measuring mortality.

2.1.6 Life expectancy

Life expectancy refers to the number of years a person is expected to live based on the statistical average. Though, it tends to varies based on geographical area. The life expectancy for a particular person or population group depends on several variables such as their behaviours pattern of their lifestyles, access to quality health care, diet intake and socioeconomic status. However, as life expectancy is calculated based on averages, a person or a group of society may live for many years more or less than what was expected based from the calculation.

In this study, life expectancy indicates the number of years of a new born infant would live if prevailing patterns of mortality and diseases at the time of its birth were the same throughout its life captured by taking the number of years of an oldest person in a household's house he/she lives as used by (Fayissa et al, 2005).

2.2 Health status in Zanzibar

In Zanzibar, efforts and strategies for health improvement have been taken since establishment of Revolutionary Government of Zanzibar in 1964, where the first president of Zanzibar the late A A. Karume declared a free health and education services in the Islands (Rgoz, 2010). The main objective was to improve health status and controlling the wide spread of killing diseases particular malaria, cholera, polio, undernourishment diseases and reducing infant, child and maternal mortality rate by abolishing cost sharing and inequality in the provision of health services that were used before revolution (RGoZ, 2009). The same objective is maintained under the implementation of Zanzibar Strategy for Growth and Poverty Reduction (ZSGPR) and Zanzibar Development Plan “Vision 2020” in improving people’s socioeconomic status (SES) including health care systems in accordance with the Sustainable Development Goals.

However, health status of Zanzibar is normally taken into consideration by overall health status evaluation of the entirely country of Tanzania. It is taken as one dimension of calculating Human Development Index (HDI). HDI include components like long and healthy life measured by the rate of life expectancy, literacy and gross domestic product per capital. Higher HDI demonstrate positive health indicators as it reflects low level of morbidity, mortality and higher life expectancy. Tanzania including Zanzibar experienced to have low level of HDI with sluggish growing rate from 0.353 in 1990 to 0.47 in 2012 (URT, 2014). This indicates poor level of health indicators like infant, child and maternity mortality as well as malnutrition not only in Zanzibar but also in Tanzania mainland.

Though, health indicators of health status particular morbidity, mortality and life expectancy demonstrate different proportions between Tanzania mainland and Zanzibar. However, according to (TDHS, 2010), life expectancy increased from 42 years in 1967 to 51 years in 2002, and to 61 years in 2012. The statistics further showed that female life expectancy at birth in 2012 was higher (63 years) than that of males (60 years). From the late 1980s to 1990s not only the sluggish increase in life expectancy was experienced but also higher adult mortality rate that caused life

expectancy to remain almost constant at 51 years due to the prevalence of HIV/AIDS epidemic. In Zanzibar, life expectancy has continuously increased, from 55 years in 2003 to 60.7 years in 2013 with higher rate in Urban West and low rate in North Pemba as presented in Table 2.2.

Table 2.2: Life expectancy at birth by region - Zanzibar

Region/Year	2004	2006	2008	2010	2012
Zanzibar	57.3	57.6	58.3	59.0	59.6
Urban West	59.1	60.1	60.8	61.5	62.1
North Unguja	55.5	56.9	57.7	58.0	58.7
South Unguja	57.8	58.0	58.7	59.5	60.1
North Pemba	54.8	55.1	55.9	56.5	57.1
South Pemba	57.9	59.6	60.3	60.7	61.4

Source: URT (2010; 2014)

In 2002, Zanzibar initiated a five years health sector reform under the guidance of the Zanzibar Health Sector Reform Strategic Plan on implementing Zanzibar Strategy for Growth and Poverty Reduction (MKUZA) and vision 2020. The reform was seeking to decentralize planning, prioritization and integration of services to district level aimed at ensuring the availability of equitable high quality health care services, which focus on minimization/eradication of chronic diseases and improving people's life expectancy. The increased in life expectancy during this period was partly attributed due to the controlled of infection diseases, prevalence of health care services at rural level and higher people's awareness on HIV/AIDS as a part and parcel of the consequences of these reforms and led to 0.6% prevalence of HIV/AIDS in the islands in 2012 (URT, 2011).

Moreover, according to Population and Housing Census (2012), Zanzibar demonstrated that MDGs target of reducing maternal mortality ratio by three quarter at the end of 2015 was not met, this is due to the fact that, by the end of 2015 the maternal mortality rate was 398 above the target, child mortality declined from 42 deaths per 1000 children in 2004 to 29 in 2010. While infant mortality declined from 61 deaths per 1000 live births in 2004 to 45 in 2010. The target of reducing this indicator from 68 deaths per 1000 live births in 2005 to 38 live deaths per 1000 live births by 2015 is probably achievable. In terms of child mortality, data shows

impressive gains in child survival in both Zanzibar and mainland as Table 2.3 present.

Table 2.3: Tanzania trends in childhood and infant mortality from 1989 to 2010

Rate	1989-1992	1992-1996	2000-2004	2003-2007	2006-2010
Infant mortality	141.1	137	112	91	81
Under 5 mortality	91.6	88	68	58	51

Source: NBS (2011)

However, a higher percentage of morbidity and mortality in Zanzibar now contributed by cardiovascular diseases mainly diabetes, stroke, HT, cancer, chronic respiratory diseases though there are no proper records documented. These fatalities were facilitated due to the rapid changes of people's life styles followed by the increase of income and living standard since at the end of 1990s. These diseases were considered rare or diseases of the rich during 1990s but now is a normal phenomenon.

2.3 Theoretical literature

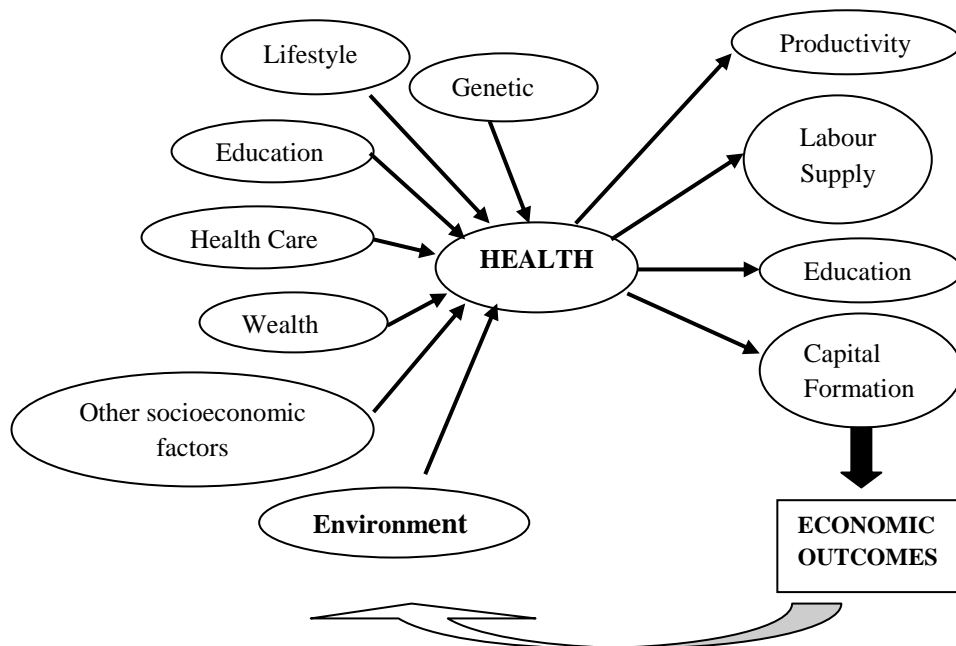
2.3.1 The Grossman Health Model (1972)

The Grossman Health Model was developed by Michael Grossman in 1972 and has been identified as one of the first model to distinguish between health as a consumption good (utility function) and health as a capital good (production function). The model emphasises that, health is not only demanded, but also produced by individuals. Those who value their health highly and care sufficiently about their future will have long healthy life and better behaviours for their health than those who do not.

In the model, individuals are both consumers and producers of health. The model predicts that, an individual would invest in health until the marginal benefit of health equals its marginal cost. The central proposition of the model is that, individuals inherit an initial stock of health that depreciates with age. However can be increased by investment using diseases preventive and protective instruments in building that stock of health through proper eating styles, quality accessibility of health care,

education and health skills, cessation of tobacco and alcoholic intake as well as physical activity. According to the model, these will reduce the rate of morbidity and mortality while increasing the stock of health for production at the same time. The increase in the stock of health implies that, increasing healthy time of individual that can accelerate the rate of production as the higher inputs injected for the demand of a good health, the higher economic outputs produced and vice versa is true as postulated by Lawson, (2012) in Figure 2.1.

Figure: 2.1 Health input and Health output



Source: Akanni O. Lawson, (2012). Health and economic growth

Grossman argues that, if individuals or community invest (capital) on health, will live longer life with healthy time by cutting the risk of illness and death at both individual and country levels as well as contributing to economic outcomes. Since healthier individuals would reasonably be expected to produce more per hour worked and cause direct increase in productivity due to enhanced physical and mental activities. He further suggests that, a person's stock of health determines the total

amount of healthy time and happy life as well as the total amount of time he can spend on producing services and commodities.

Therefore, the Grossman model of health depends on the investment on health stock as shown in equation 2.3.1

$$U = U(\Phi_0 H_0, \dots, \Phi_n H_n, \dots, Z_0, \dots, Z_n) \dots\dots\dots (2.3.1)$$

Where H_0 is the inherited stock of health, H_i is the stock of health in the i th time period, ϕ is the service flow per unit stock, $h_i = \phi H_i$ is total consumption of "health services," and Z_i is total consumption of another commodity in the i th period.' Note that, whereas in the usual inter temporal utility function n , the length of life as of the planning date, is fixed, since it is an endogenous variable. In particular, death takes place when $H_i = H_{min}$. Therefore, length of life depends on the quantities of H_i that maximize utility subject to certain production and resource constraints.

By definition, net investment in the stock of health equals gross investment minus depreciation as presented in equation 2.3.2.

$$H_{i+1} - H_i = I_i - \delta_i H_i, \dots\dots\dots (2.3.2)$$

Where I_i is gross investment and δ_i is the rate of depreciation during the i th period. The rates of depreciation are assumed to be exogenous, but they may vary with the age of the individual. Thus, according to Grossman, the healthy time of the individual will depend on the rate of investment on the health stock lowered by increasing of age of the individual.

Ever since 1972, Grossman's model of investment in health capital has been the cornerstone of the way health economists model health behaviours. Over the years however, a number of criticisms have been aimed at the Grossman model. The major criticisms have recently been set out by Zweifel (2012a).

Zweifel in particular has argued that there are enough sufficiently severe problems with the Grossman model that health economists should look for an alternative. The Zweifel criticisms first demonstrate that the model does not make current health behaviour dependent on the past; second it does not prevent an individual choosing to live forever; third it does not predict that health declines with lower socio-economic status; and last the model predicts that there will be a positive relationship between health investment and health status whereas empirically this relationship is typically negative (Zweifel, 2012a).

In this study, variables like income, education, age, gender, marital status, health care accessibility, meal intake and life styles (BMI) are going to be used by the researcher for analysis in the model as they provide a greater linkage with the theory in investigating the relationship between household's income and health status. According to Grossman (1972) those who value their health highly and care sufficiently about the future using diseases preventive and protective variables as mentioned above will have long healthy life by cutting the risk of illness and death as well as contributing to economic outcomes due to their energetic services as labours. The variables used in the models determine the health status of the household as predicted by (Grossman, 1972).

2.4 Empirical review

Deaton (2003), conducted a study in United State on Mortality, Education, Income and inequality among the American cohort and find that, family with income less than \$ 5,000 in 1980 could expect to live about 25 percent fewer years than people whose family income was greater than \$ 50,000. Deaton explored the finding using both individual data and a panel of aggregate birth cohort data from 1975 to 1995. The study assumed health was determined by income, defined as a total earning per year. The results depict further that, income reduce the risk of death, but they also

confirm that, increased in income raise mortality even when the long run effects of income are in the opposite direction. However, the study did not find the effect of income inequality on raising mortality beyond what it would otherwise have been.

Jensen (2004), from his empirical study conducted in Russia where Russian Longitudinal Monitoring Survey (RLMS) has been used involving 4,000 households collected between 1992 and 1998. The data contained detailed information on income, expenditures and a variety of measures of health and health risk factors, systolic and diastolic blood pressure used to assess hypertension, a leading factor in heart attack and strokes as well as construct the body mass index (BMI) which is an important predictor of mortality. In addition, self-assessed of health to respondents has been used to evaluate their overall health, with possible responses ranging from 1 to 5 (1 = very good; 2 = good; 3 = average; 4 = bad and 5 = very bad). The results depicted that, nutrients intake among wealthier households reduce the risks of morbidity and mortality while deficiency to the poor increase the rate of illness. Also, he revealed that most of the poor in Russia suffer with heart attack and stroke due to poor diet. However, the morbidity and mortality of the wealthier recorded to have been higher twice than the poorer due to improper diet.

Fuchs (2004), on the other hand conducted a study involving 149 countries using comparative design in 1990s on testing income relation to health by American Diabetes Institute in US. When these 149 countries were sorted into quintiles according to GDP per capita in the late 1990s, those in the middle quintile (\$ 3860 average GDP per capita) have 20 years more life expectancy than countries in the lowest quintile (\$ 800 GDP per capita), but only 10 years less than countries in the highest quintile (\$ 20,910 GDP per capita). In the same study, 3 health behavior measures were investigated including obesity ($BMI \geq 30$), smoking and excessive alcoholic consumption using National Health Interview Survey (NHIS). In each case, sample population aged 45 and older has been used. The results demonstrated that, smoking and drinking exhibit a largest correlation on lowering life expectancy by 16% with the increase of income.

Fayissa and Gutema (2005), analyzed the determinants of health status (longevity) in SSA. The study on its investigation used two way random effect models in the analysis where the findings suggest that, an increase on the level of education, health skills and nutrients intake are positively linked with the improvement of life expectancy at birth in SSA.

Glaeser and Cutler (2005), conducted a survey on determining the impacts of social factors in Europe using vector error correction model. The survey conducted by NHIS in 1999 using 4,000 samples composed both sex aged above 45 restricted to individuals with higher income levels and asks a number of questions about the potential adverse effects of different behaviours in a form of: “Does cigarette smoking increase the chance of developing lung cancer?” with possible responses of: definitely increases, probably increases, probably does not increase and definitely does not increase. The question used to demarcate people by whether they believe the behavior in question definitely increases the risk or not. For smoking, questions were asked about the link to cardiovascular disease, cancer and respiratory problems. Other questions also asked about the harmful effects of alcohol, being overweight and having high blood pressure. The results show that, the vast majority of people believe that these behaviours are harmful and leading to CVDs. For example, 74 percent of people respond that cigarette smoking is definitely related to cardiovascular disease, 86 percent believe it is definitely related to cancer, and 85 percent believe it is definitely related to respiratory problems. For alcohol use, being overweight and having hypertension, the corresponding figures were 87 percent, 75 percent and 69 percent respectively.

Suheil (2007), in Kenya also conducted a study on analyzing risk factors for hypertension among urban males in Mombasa. The study used a community based cross-sectional design among 187 adult male residents of Mombasa in Kenya. The methods involved survey on awareness using a structured questionnaires as well as physical examination on anthropometric measurements and blood pressure. The results depicted that, the prevalence of Hypertension (HT) in the population was found to be 6.7%, increase in age and smoking were found to be a predisposing risk

factor for HT. Smokers had significant risk ratio of 4 in acquiring HT. It was also noted that Chewing of Miraa and Drinking alcohol had no significant association as a risk predisposing to HT, although many alcohol consumers had HT. The study unveiled that physical exercise had protective effect thereby decreasing the risk of having HT. High Body Mass index (BMI) and Weight to Hip ration (WHR) was a predisposing risk factor for having HT.

Ogunleye (2011), conducted a study on Health and Economic growth in Sub Sahara African Countries employing the Arellano-Bond Dynamic GMM technique for 40 SSA countries, where alcohol consumption, urbanization and carbon emission were found to be statistically significant determinants of child and adult mortality. Also, food availability turns out to be a significant determinant of life expectancy in SSA.

Mayige et al (2012), conducted a study in Tanzania at National Institute for Medical Research (NIMR) - Tukuyu Centre on determining the risk factors of Non Communicable Diseases (NCDs). The results depicted that, smoking, alcohol intake, unhealthy diet and low physical activity are prevalent in both rural and urban communities as the main risk factors for NCDs. The study also depicts that, socio-demographic and economic transition has a big role in the current rise of non-communicable diseases in Tanzania.

Savage et al (2014), in Tanzania conducted a study in collaboration with the Manchester University on the relationship between income and health where 4,000 individuals in 51 villages in Tanzania were studied using an instrumental variable approach. The results show that, a 10% increase in income among the Tanzanians reduces the number of illnesses by 0.02% as well as increase BMI by 0.01% which reduce the longevity of individual as higher BMI believed to be the source of many non communicable diseases like pulmonary diseases, hypertension and heart diseases. Also, the researchers find that, a 10% increase in income implies an increase of about 0.1% vaccinations of children under six.

2.5 Research gap

Theoretically, numerous models, health promotion theories and lifestyle medicine interventions have been developed by several psychologists and health economists like Grossman, where lifestyle interventions such as keeping physical active, alcoholic and smoking cessation, proper diet intake, health skills and stress management have been emphasized in shaping health status. However, higher variation of health care accessibility, information, adaptation of health promotion theories and coping skills has made health status of the world and Tanzania to vary significantly among households.

In Tanzania, beside the faster economic growth since 1990s, health problems increase at unimaginable rate (Mayige et al, 2012). In the country, few studies has been conducted about the relationship between health and income like that of Mayige et al (2012) who performed a study on determining factors for non communicable disease, Mgunya (2012) conducted a study at Muhimbili University which examines the risks factors for cardiovascular diseases among patients living with HIV/AIDS and last Savage et al (2014) who analysed the relationship between income derived from rainfall fed agriculture and health status by focus only morbidity in Tanzania mainland. Generally, to the best of my knowledge no study has been done in Zanzibar concerning the relationship between income and health status. This study therefore, is intended to fill this gap of knowledge by making an analysis of the relationship between household's income levels and health status in Tanzania and specifically in Zanzibar. The focus being to find out if there is a relationship between morbidity and household's income, relationship between mortality and household's income and a relationship between life expectancy and household's income.

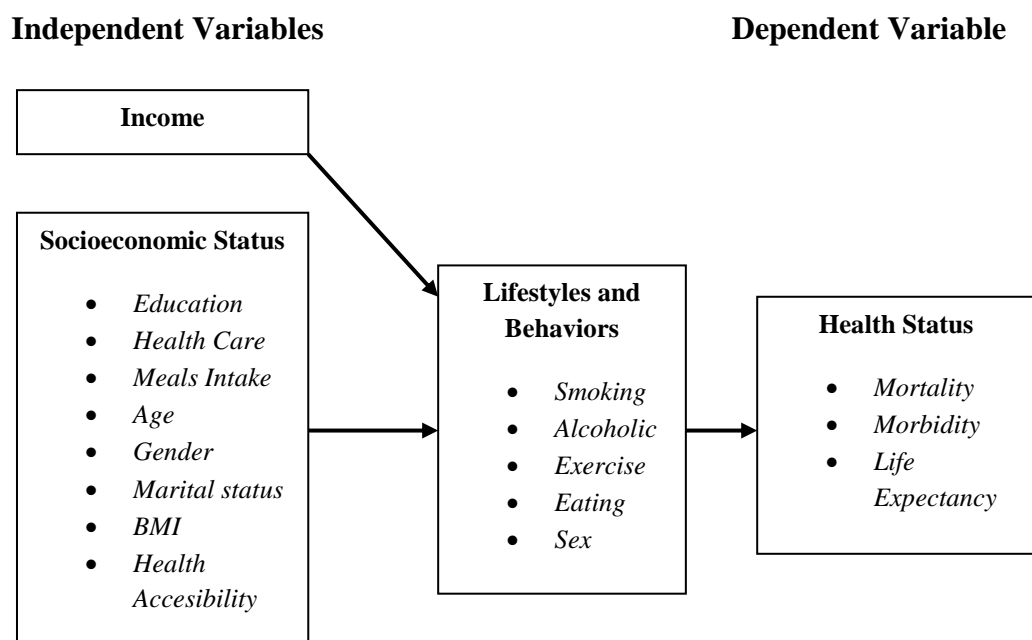
2.6 Conceptual framework and research model

The model for this study is based on the theoretical presented above on determining the relationship between income and health status. In the literature, it has been shown theoretically that, health status is not only being influenced merely by the level of income, hence influenced by several of interplay determinants as postulated by (Grossman, 1972). The more prevention and protection instruments invested on the

health stock using income improve physically and mentally conditions of the individual/community necessary for higher production and vice versa is true.

Therefore, the researcher was also incorporated with socioeconomic features like age, marital status, gender, education, distance from a health facility, meals intake per day and body mass index (BMI). However, there are many other exogenous factors that might affect the relationship between income and health status like health policies, environment, socialization, genetics, psychology and how one deal with life's stress and challenges. In this case therefore, the conceptual framework is presented in figure 2.6.

Figure 2.6 Conceptual diagram



Source: Researcher's construction, 2015

Figure 2.3.2 shows that there are many factors that affect health of individuals or communities. Whether people are healthy or not, is determined by their circumstances and environment. To a large extent, factors such as how people behave in life, the place where people live, the state of their environment, genetics, income and education level all have considerable impacts on health. A large body of

literatures demonstrates determinants of health to include, social and economic environment, physical environment and person's individual characteristics and behaviours (WHO, 2014).

According to WHO (2014), the social and economic environment is referring to the general socioeconomic status (SES) of individuals/communities. Individuals/communities with higher socioeconomic status like higher income and social status like education, healthy living environment, accessibility of quality health services that prevent and treat disease timely as well as social support networks from families, friends and communities are all linked to better health. Hence, the greater the gap between the rich and the poorer on SES the greater the differences in health status.

The quality levels of the physical environment where people live also affect health of the individuals/communities. Determinants like safe water, sanitation and clean air, healthy workplaces, safe houses and friendly communities all contribute to good health. In physical environment, the nature of genetic of the communities also matters on influencing health status of individuals. Hence it involves inheritances of genes and other characteristics that play an important part in determining lifespan of the community, healthiness and the likelihood of developing certain illnesses. Personal behaviours, lifestyles and coping skills also have a greater role in determine the health status of individuals. Balanced eating, keeping physical active, tobacco and alcoholic intake as well as how people deal with life's stresses and challenges all affect health of individual/communities.

2.6.1 Relationship between income and health

Health economists have attributed that there is a correlation to the effects of income level with health status of an individual or community by demonstrate that, higher income people are better able to understand, access and use health information and better in position to benefit from health care system. This is simply hence, higher income households enable in affording socioeconomic goods and services necessary in promoting health status than the poorer. The accessibility of nutritious food,

education, good housing and sanitation, quality health care services as well as enough health skills and information that contribute in minimizing unhealthy behaviours like excessive smoking and alcoholic intake, the use of junky foods and other poor eating styles as postulated in the conceptual framework are all influencing on positive health outcomes. This made higher income groups/individuals healthy and live longer compared to those with low level of income. Poor people live shorter life than rich people as they are in higher risk of diseases and fatal due to their deficiency of nutrients foods, quality medical care and unhealthy living environment leading to negative health outcomes associated with higher rate of morbidity, mortality with low level of life expectancy. Hence, those community/individual who suffer from materials deprivation are also those who suffer from health deprivation. For example Case (2004) presents evidence that children from poor families have worse health than children from richer families.

Grossman (1972) observed negative health outcome when one allocate his/her income on unhealthy behaviours such as extremely intoxication intake, poor eating styles, over use of food additives like salts and sugar, higher sedentary life with physical inactivity. Most of the morbidity and mortality in higher income groups are linked with diseases associated with these risky behaviours particular coronary heart diseases, stroke, cancer and diabetes. Again, a study from Case (2004) for example demonstrates that, 98% of the morbidity and mortality in United State are due to cardiovascular diseases resulted from the misuse of income over unhealthy behaviours as demonstrated in the conceptual frame work. This tendency is similar to all higher income groups and not only in developed world but also in poor countries where higher income households led in diseases and fatalities associated with CVDs and HIV/AIDS.

2.6.2 Relationship between income and morbidity

The existence of a positive correlation between income and morbidity has been well acknowledged by many economic scholars and psychologist since at the mid 18th century. Income can facilitate the acquisition of quality medical services, nourishment foods, safe and clean living environment and other goods and services that contribute to better health. Though, the same income (holding education and other variable constant) might lead to unhealthy living styles that offsetting the possible favorable effects of higher income on protecting people's health, consequently be the first step toward increasing of ill health and fatalities associated with cardiovascular diseases and HIV/AIDS. A growing body of literature demonstrated on how income could be used as a health destructive instrument via unhealthy behaviours like extremely intoxication, eating disorder, physical inactivity and higher intake of food additives particular salts and sugar.

There are also a number of studies which show how low income people suffer with higher rate of diseases and deaths. The higher level of poverty and inequality create a natural barrier for poorer people in purchasing goods and services as postulated on the conceptual framework necessary in improving health status.

Raphael (2004) reveals that low income families are more likely to experience greater incidence of variety of illnesses, long hospital stays, accidental injuries, mental health problems, lower school achievement and early drop out. These are fuel because of inaccessibility of materials and services necessary in promoting positive health outcome, since mostly use unsafe water, live in poor environment, inaccessibility of medical care, poor health skills and live with higher stress. Hence, increase the risk of diseases that might lead to chronic diseases and/or deaths. Many low income households in poor countries including Tanzania mainland and Zanzibar in particular, suffer from both preventable communicable and non communicable diseases like infectious and cardiovascular diseases. Report from the recently outbreak of cholera in almost all regions of Tanzania mainland and Zanzibar in particular was said to be facilitated by poor living environment, uses of unsafe water and low health skills and information.

2.6.3 Relationship between income and mortality

In trying to understand why mortality is so strongly related to income and other socioeconomic status has been a major concern in demography, epidemiology and to health economists for many years. Many writers believe that there is at least some direct protective effect of income, and in a recent literature much identified with the work of (Wilkinson 1996), whereas he argued that, while the first moment of income is protective, the second moment is a health hazard. The hazard is due to the risk behaviours associated with modern lifestyles said to be the main causes of higher morbidity and mortality to both rich and poor households.

Higher income groups mostly die due to their risk behaviours and the poorer due to their health risk environments. Poor consumption patterns of income by the higher income households such as tobacco and alcoholic intake, exceedingly use of food additives like salt, sugar and over intake of saturated fats always lead to negative health outcome. Wealthy individuals felt higher prestige and proud in conducting over sedentary life with these unhealthy behaviours without knowing if they ruin their health status. Consequently, increase the incidences of higher diseases risk that might lead to permanent disability and/or death. Wilkinson (1996) and Case (2004) demonstrate that, risk behaviours contribute 98% of deaths in rich countries and mostly associated CVDs. In poor countries, HIV/AIDS followed by infection and cardiovascular diseases are leading in causing deaths due to their higher risk environments, malnutrition, long starvation and unsafe sex all said to be facilitated by poverty. Further, it has been reported that, African regions failed in achieving health related Millennium Development Goals (MDGs) compared to other continents since, HIV/AIDS and other infection diseases like malaria, tuberculosis, cholera and diarrhoea were still remain the major causes of morbidity and mortality in the region with estimated under five mortality incidence of 148 per 1,000 live births in 2007 (WHO, 2010).

This was attributed due to poor health expenditures invested not only at macro level but also at micro level in most of the SSA including Tanzania. Consequently, reduces the poorest family's capacity to produce led to a vicious cycle of poverty, malnutrition and ill health. These make the persistence of poor health poor economy

as postulated by Grossman (1972) and Lawanson (2012) while healthier individuals would reasonably expected to produce more per hour worked and capable of making better and more efficient use of technologies and other equipments in the productions.

2.6.4 Relationship between income and life expectancy

The variations of income led to higher differences of life expectancy in both rich and poor communities. The global divergence in life expectancy of today was the result of the global divergence in per capita income and health around the middle of the 18th century. As the conceptual framework depicted, income determine consumption pattern that reflect people's lifestyles and health status respectively. Higher consumption on building positive health outcome by the higher income individual/community such as proper diet intake, easily accessibility of quality medical services, good sanitation and hygiene, health skills and information made such individual/community to live longer with happy life compared to those with low income. For instance countries like US, Canada, Japan and French recorded to have more than 77 years of life expectancy due to have higher GDP per capital averaged to \$34,000 (WHO, 2014).

Among the poorest countries, increase in average income is also strongly associated with the increase in life expectancy as it tends to accelerate the improvement of living conditions of the poor to a better living standard. This enabled the poor in accessing and managing goods and services necessary in improving positive health outcome. Improvement of socioeconomic determinants of the poor has a positive correlation with health status (Deaton, 2003). Health status that includes life expectancy appears to increase monotonically with the increase of income in the sense that more income improves health status by more among those with low level of income than among those with higher level of income. Since, there is little correlation between higher gross national product (GNP) per person and life expectancy. For example Greece, with a GNP at purchasing power parity of US\$17,000 with a life expectancy of 78.1 years; the US with a GNP of more than \$34,000 has a life expectancy of 76.9 years; Costa Rica and Cuba stand out as middle

income countries with GNPs less than \$10,000 and yet life expectancies stood at 77.9 years (WHO, 2015).

2.6.5 Relationship between age and health status

Jane (2004), revealed that, health decreases with age as it is a fundamental fact of biology. The rate of depreciation depends on the life styles, income and other socioeconomic factors. Hence, the more unhealthy behaviours toward higher ages of the individuals, the worse health status is likely to be.

2.6.6 Relationship between gender and health status

According to Jane (2004) differences in gender in relation to biological, physical and socioeconomic features matter in affecting health status between male and female. Male are exposed with higher risk of diseases than female due to their life styles, interactions on environments and dangerous or higher risk occupations. These are enough in trigger higher morbidities and mortalities to male and hence, lower life expectancy compared to female.

2.6.7 Relationship between education and health status

Case (2001) demonstrate that, level of education determine people's health since gives knowledge on general ideas on how people should invest on health via protection and prevention tools for better health like physical activity behaviours, healthy diet intake as well as cessation or minimization of unhealthy behaviours for better health. Therefore, those with higher education above secondary would care about their health status using health protection and preventive tools.

However, the variation of education also matter on health, since those with non health related education like engineers, accountants, economists were less health skilled than those major in health related education like nursing and medical assistants.

2.6.8 Relationship between BMI and health status

The BMI is an important proxy of morbidity and mortality as it quantifies the percentage of body muscle and fat. Normal BMI reduces health complications while higher BMI indicates superior risk of higher blood pressure and cardiovascular diseases like hypertension, diabetes, heart diseases, stroke and cancer.

2.6.9 Relationship between smoking/alcoholic intake and health status

Jane (2004) courted from Doll and Hill (1954) reported that smoking cigarettes and alcoholic intake contribute to many cardiovascular diseases like cancer (e.g. lungs, throat, stomach and bowel), coronary heart disease and increases the chance of disorders such as liver cirrhosis, cancers (e.g. pancreas and liver), hypertension and memory deficits respectively. Male have higher risk of cardiovascular diseases hence they are strongly linked with higher concentration of smoking and drinking compared to female.

2.6.10 Relationship between accessibility of medical care and health status

The accessibility of quality health care holding financial capacity fixed, contribute to better health of any society and vice versa. Though, such accessibility varies to different physicians and sometime hospitals among rich and poor due to income, medical insurance and distance from the health facility. Therefore, those who have medical insurance with higher income tend to have better health than those who are less.

2.6.11 Relationship between meals intake and health status

Taking three meals a day is said to have positive correlation with health status of individuals (Jane, 2004). The meals assumed to cover all four important nutrients like carbohydrates, vitamins, proteins and fats. Therefore, those who take three meals a day are said to have better health than those who are less.

However, such accessibility of nutrients meals depend on the level of income since vary between the rich and poor. Moreover, overeating of such recommended diets or meals according to Jane, (2004) noted from Herman and Polivy (1980, 1988) said to be the main source of cardiovascular diseases as it is mainly associated with the rapidly increasing of unhealthy BMI like obesity.

2.6.12 Relationship between physical exercises and health status

Behaviours of Physical exercises have strong correlation with health status as noted by (Jane, 2004). Keeping physical active lowers BMI that minimize cardiovascular diseases and other health complications and vice versa is true. Also, she demonstrated that, keeping physical active or exercise improve psychological well-being as reduce depression, obese, anxiety and stress as well as improve self esteem and confidence and vice versa is true.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research design

The study used community based cross sectional design in which the researcher met respondents only once as recommended by (Kothari, 2004). It is a shot study design best suited to studies aimed at finding the prevalence of a phenomenon, situation or problem. The design selected because of its ability of observing the phenomenon at a time of researching due to money and time constrain.

However, for the purpose of observing the real picture of relationship and changes of health status due to income effects, meeting once to respondents is not enough for reliable and valid results from data estimation and analysis. Therefore, longitudinal study design is recommended for further research as it allows multiple observations of data from the respondents with a fixed interval of time. The approach will ensure valid and reliable observations of the relationship between income levels and household's health status overtime.

3.2 Study area

The study was carried out in Zanzibar Town specifically in urban district in Unguja Island to accommodate both peoples with low and higher income levels. The choice was made based on the existence of income inequalities among Zanzibar people that lead health inequalities among the households as well as higher prevalence of health problems associated with income. The other basis for the choice was familiarity and convenience of the researcher in Zanzibar as it ensured easy availability of valid and reliable data for estimation.

3.3 Study population

The heads of households were used as targeted population of the study covering both higher and lower income households in Urban District so as to capture the variations of the relationship between income and health status.

3.4 Samples size

Under this study, 96 respondents were used of which 90 were from the households and 6 from health specialists from the Referred Hospital of Mnazimmoja in Zanzibar as shown on Table 3.4. The researcher decides to use such sample size for valid and reliable results as lower sample below 30 would not serve the purpose of the study.

The researcher used the true population size (N) of 305,776 of the urban district since was available according to Basic Demographic and Socio-Economic Profile (2012). In order to specify the precession in respect to the estimates concerning the population parameters ± 4 was selected to be the mean of the true population with 95% confidence level. In other words, the acceptance error therefore, was 4. The standard deviation (SD) based from the past experiences of Basic Demographic and Socio-Economic Profile (2012) was 2.

Since population size was finite, the sample size calculated as following from the formula.

$$n = \frac{z^2 \cdot N \cdot \sigma^2}{(N-1)\ell^2 + z^2 \cdot \sigma^2}$$

Where:

N = Population size

ℓ = Acceptance error (precision)

z = As per the table of area under normal curve for the given confidence level of 95%

σ = Standard deviation of population

Therefore,

$$n = \frac{(1.96)^2 (305,776)(2)^2}{(305,776 - 1)(0.4)^2 + (1.96)^2 (2)^2} = \frac{4,696,719}{48,939.36} = 95.97 = 96$$

Table 3.4 Sample plan

SN	Name of Ward	Name of Shehia/ Institution	Number of Households/Officers	Number of Respondents
1	Mji Mkongwe	Mkunazini	5	5
		Malindi	5	5
		Darajani	5	5
2	Mwanakwerekwe	Mwanakwerekwe	5	5
		Magomeni	5	5
		Amani	5	5
3	Jangombe	Kwaalinatedu	5	5
		Mwembenjugu	5	5
		Jangombe	5	5
4	Mpendae	Mombasa	5	5
		Mpendae	5	5
		Kwamchina	5	5
5	Kiembesamaki	Kiembesamaki	5	5
		Mbweni	5	5
		Chukwani	5	5
6	Mlandege	Mlandege	5	5
		Michenzani	5	5
		Mwembetanga	5	5
7	Health Specialists	Mnazimmoja	6	6
		Referred Hospital		
Total			96	96

3.5 Sample techniques

Simple random sampling technique was used to ordinary respondents in selecting households as samples to be used in the study. The method was used to give each household an equal chance to be selected in the study. However, purposive sampling technique was applied to health specialists at Referred Hospital of Mnazimmoja concerning infection, cardiovascular diseases and HIV/AIDS.

3.6 Variables measurements and descriptions

As it has been explained earlier, health status is not determined solely by income, hence other social determinants of health were added in the model so as to capture the pure effect of income on health status as described by Table 3.5.

Table 3.5 Variables measurements and descriptions

Dependent Variables	Descriptions of variables	Measurement	Expected Outcome
Health Status	Morbidity: Unhealthy conditions of an individual or community resulting from illness, harm or diseases.	Number of self reported illness of the household's member in past three months.	To have Positive impact with income
	Mortality: Number of deaths by illness occurred in household's house.	Years of life lost (YLL) ¹	To have Positive impact with income
	Life expectancy: number of years a person is expected to live based on the statistical average.	Expected number of years of a new born infant by taking the number of years of the eldest member of the household lives.	To have Positive impact with income
Independent Variables	Descriptions of variables	Measurement	Expected Outcome
Household's Income	Total household's expenditure in value per month.	Household's expenditure per month.	Positive impact
Education level	Educational level of the respondents	Total years of schooling	Negative impact to morbidity and mortality and positive to life expectancy Negative impact
Health care Accessibility	Accessibility and availability of health care	Distance to health facility in meters.	
Body Mass Index (BMI)	Quantifies the amount of muscles and fats of the respondents by categorised into underweight, normal, overweight or obese	BMI ranges in kg/m ²	Expected to have negative impact on health status
Meal Intake	Nutrient meals cover carbohydrates, protein, fats and vitamins	Number of meals taken per day	Expected to have positive impact on health status
Age	Age of the household	Total number of years of the head of the household.	Expected to have negative impact
Marital Status	Marital status of respondent where Married taken as 1 and none married as 0.	Dummy variable	Married expected to have positive impact
Gender	Gender of respondent where Male assumed as 1 and female equal to 0.	Dummy variable	Female expected to have negative impact

¹ Years of life (YLL) is one among tool used to measure mortality of individual or community. It measures total number of deaths in percentage that occur before reached their maturity (life expectancy rate (which is known as reference age). To compute the YLL, it just subtract the reference age with the age of individual during his/her death. $YLL = \text{reference age} - \text{age of individual during the death}$. To calculate the YLL for a particular population in a particular year, it just sums the individual YLLs for all individual in that population who died in that particular year. It can be done for all cause of mortality or for specific cause of mortality.

3.7 Data collection

Primary and secondary data sources were used in collecting appropriate information and statistics from the respondents and institutions for assessing the comprehensive relationship between income and health status. Techniques like questionnaires, interview and observation were used in collecting primary data from respondents and document review for secondary data where public publications, journals and books were reviewed.

3.7.1 Primary data collection methods

In this study, three major techniques were used to obtain primary data; namely questionnaire, interview and observation.

3.7.1.1 Questionnaires

Is an instrument of data collection consisting of a set of predetermined and structured questions given to the subject to respond in writing or to be filled by the researcher through self administered questionnaire (Adam and Kamuzora, 2008). Hence according to Kothari (2004), structured questionnaires are simple to administer and relatively inexpensive to analyse.

The self administered questionnaires were used contained both open ended questions to allow the respondents to provide adequate information and closed ended questions to enable the respondents to answer the questions upon the requirement of the researcher. This method was used since was the most flexible tool in studying respondent's perception and opinions as it possessed a peculiar advantage over other tools in obtaining both qualitative and quantitative information.

3.7.1.2 Interview

Kothari (2004) defined interview as a method of collecting information which involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. It is a face to face interview in which the researcher set predetermined questions for collecting required information.

Semi structured interview schedules were used to key informants in collecting primary data required in Referral Hospital of Mnazimmoja. Officers of non

communicable diseases department (NCDs) were administered through this instrument. The tool was designed for the purpose of getting in depth information in a more systematic way. Because of their positions and time limit for key informants, this instrument was viable to provide the required information in order to save time and cost of the researcher. The method encourages participants to respond more openly, confidentially and the author was able to clarify questions where necessary to the respondents.

3.7.1.3 Observation

Observation is a non scientific method of data collecting involving studies relating to behavioural sciences around the research field (2004, Kothari). It enables the researcher to gain more information on the natural behaviours of the respondents/society without asking.

The researcher used structured observation in investigating information which could not easily been obtained through other methods as well as by verifying the truth of statements made by informants in the context of questionnaire or interview for reliable data.

3.7.2 Secondary data collection methods

Kothari (2004) defines secondary data as those data which have already been collected by someone else and which have already been passed through the statistical process. Reviewing secondary data widens the scope of the researcher toward the study. Most of the secondary data in this study have been obtained via internet.

3.7.2.1 Documentary review

In widening the scope of the researcher pertaining the study, the following documents were reviewed: Global human development report of 2014; African fact and statistics of 2015; Tanzania demographic health survey of 2010; Tanzania human development report of 2014, Tanzania HIV/AIDS and malaria indicators survey of 2011 and Zanzibar human development report of 2009. Also, the researcher reviewed several previous researches concerning relationship between income/development and health status from US, Nigeria and East Africa.

3.8 Validity and reliability

Validity is the quality that an instrument used in a research is accurate, correct, true, meaningful and right (Msabila, 2013). Also defined reliability as the measure of the degree or extent to which a researcher instruments yield consistence results of the data after repeated trials. These two qualities are very important in a research as they have great influences on the research objective and conclusion to make regarding the research findings (Kothari, 2004). The instruments for this study were tested for validity and reliability to determine whether they need improvement or not. A validity instrument should accurately measure what is supposed to measure in a research.

To ensure reliability is satisfied by the instrument, the researcher used simple language and clear instruction which was appropriate to the respondents in collecting relative data. The data collected from the respondents via questionnaires and interviews were carefully and accurately sorted, edited, coded and summarized using stata software. In the estimation, appropriate estimation techniques has been selected and several post specification tests such as Skewness and Kurtosis test, Shapiro Wilkes normality test, endogeneity test, heteroskedasticity test as well as correlation matrix were conducted to ensure that the results were valid and reliable.

In order for the OLS estimator to be efficient under classical assumptions, required the variance of the error term to be constant and the same for all observation. Though, when using seemingly unrelated regression, detection or testing for heteroskedasticity tend to be different than the normal method used in multiple linear regression, even if all they can use the same estimator of ordinary least square (OLS). In this case, Breusch-Pagan test of independence error was used to determine the presence of heteroskedasticity in SURE, hence in our data we had expected to have higher variation on health status between the rich and the poor since socioeconomic status like income, education, accessibility of health care, diet intake and BMI are also tend to vary among the two.

Breusch-Pagan Test of Independence error is the appropriate technique of testing variation of the error terms over observations in SURE. It tests the assumption that the errors across equations are contemporaneously correlated. The test use langrange multiplier statistic that has a chi-square distribution. The null hypothesis is no contemporaneous correlation and the alternative is contemporaneous correlation.

3.9 Data analysis

The process of data analysis aims at determining whether observations support the hypotheses formulated before going into the field to collect the information or reject them (Adam and Kamuzora, 2008).

Therefore, analysis was estimated using computerized software “STATA Package”. Seemingly Unrelated Regression Estimation (SURE) was selected where Generalized Least Square estimator (GLS) was used in estimating and assessing the relationship between income levels and health proxies such that morbidity, mortality and life expectancy of the households. The model was selected hence the study involved three equations as a system of equations holding SURE conditions that, 1) The error terms in the different equations are related and 2) the equations involved the same set of parameters.

The benefit of selecting such technique was its capacity of estimating regressions and yield consistent and efficient estimators as well as eliminating the possibility of serial correlation problems which would be expected to occur when using separate three equations via OLS technique which yield consistent results but not much efficient estimators like SURE. The results obtained were used as tools for testing study hypothesis using p-values. In the estimation, the researcher decided to use these proxies morbidity, mortality and life expectancy rather than health index in estimating health status, since health index would narrow healthy information due to its combination that can affect the reliability and validity of the study’s results.

3.9.1 Estimation model

For estimating health model, researcher used three dependent variables of Morbidity (MORB), Mortality (MORT) and Life expectancy (LIFE) as proxies for health status and independent variables such as income (IC), age (AG), marital status (MS), gender (GE), education (EDU), distance to health care facility (DI), meals intake (MEAL) and body mass index (BMI) on each of the three equations. The models were specified from the following illustration.

The researcher derives the health model from Grossman theory developed by Grossman, (1972). The model demonstrate that, health depend on the combination of inherited stock of health and gross health investment minus depreciation like unhealthy behaviours during the *i*th time.

The rates of depreciation are assumed to be exogenous, but they may vary with the age of the individual. According to this model, gross investment including the use of income on protective and preventive tools of health status and other socioeconomic factors like income, age, marital status, gender, education, distance to health care, meals intake and BMI. Hence, these determinants have greater relationship with health status in one way or another.

Therefore, if we assume Y_i to econometric form as health proxies and $B_n X_n$ as gross health investment factors then, we generate the health systems of seemingly unrelated regression equations of morbidity, mortality and life expectancy as follows.

$$Y_1 = a_1 + B_1 dX_1 + B_2 X_2 + B_3 dX_3 + \dots + B_n X_n + \mu_1 \dots \dots \dots (3.8.1)$$

$$Y_2 = a_2 + B_1 dX_1 + B_2 X_2 + B_3 dX_3 + \dots + B_n X_n + \mu_2 \dots \dots \dots (3.8.2)$$

$$Y_3 = a_3 + B_1 dX_1 + B_2 X_2 + B_3 dX_3 + \dots + B_n X_n + \mu_3 \dots \dots \dots (3.8.3)$$

Using more concise notation, this system of health's equations can be written as:

$$Y_i = B_{oi} + B_{1i} dX_{1i} + B_{2i} X_{2i} + B_{3i} dX_{3i} + \dots + B_{ni} X_{ni} + \mu_{ni} \dots \dots \dots (3.8.4)$$

For $i = 1, 2, \dots, 3$

Where Y is the health status, B_o is the inherited stock of health and X_s are socioeconomic determinants as health gross investment.

Specifically, the study used the following systems of health equation in estimation

$$Y_i = \beta_{0_i} + B_1 dIC_i - B_2 AG_i + B_3 dGE_i + B_4 dMS_i + B_5 EDU_i + B_6 DI_i - B_7 BMI_i + B_8 MEAL_i + \mu_i \dots (3.8.5)$$

Where

Y = Health Status for (Morbidity) $i = 1$, (Mortality) $i = 2$ and (Life expectancy) $i = 3$

B_o = Inherited stock of health

dIC = Dummy of the higher income household among respondents above 400,000/-

AG = Age of the respondents

dGE = Dummy of Gender of the respondents

dMS = Dummy of Marital status of the respondents

EDU = Education level of the respondents

$MEAL$ = Meals aspects of the respondents

DI = Accessibility of health care of the respondents in kms

BMI = BMI measure body fats and muscles.

μ = Stochastic error term, which is assumed to be normal distributed around 0 mean

and constant variance ie $\mu \approx N(0, \mu^2)$

B_s = Coefficients of the parameters X .

However, since MORB, MORT and LIFE were used as health proxies in measuring health status, health's equations were developed on the assumption of inclusion of the same set of independent variables and correlation of error terms in the health systems. Than the equations symbolically were:-

$$MORB = \beta_0 + B_1 dIC - B_2 AG + B_3 dGE + B_4 dMS - B_5 EDU + B_6 DI - B_7 BMI - B_8 MEAL + \mu \dots (3.8.6)$$

$$MORT = \beta_0 + B_1 dIC - B_2 AG + B_3 dGE + B_4 dMS + B_5 EDU + B_6 DI - B_7 BMI + B_8 MEAL + \mu \dots (3.8.7)$$

$$LIFE = \beta_0 + B_1 dIC - B_2 AG + B_3 dGE + B_4 dMS + B_5 EDU + B_6 DI - B_7 BMI + B_8 MEAL + \mu \dots (3.8.8)$$

CHAPTER FOUR

PRESENTATION OF FINDING

4.1 Descriptive statistics

Table 4.1 below presents the results of descriptive statistics of the relevant variables of the models. It shows mean, standard deviation, maximum and minimum value of all variables used in the analysis.

Table 4.1 Descriptive statistics of the estimated models

Variable	Observation	Mean	Std Dev	Min	Max
Morbidity	96	0.88	0.74	0	3
Mortality	96	0.66	0.76	0	3
Life expectancy	96	46.03	10.08	24	79
Income	96	408,125	197,965	150,000	1,200,000
Age	96	40.47	11.34	20	79
Dummy of Gender	96	0.78	0.42	0	1
Dummy of Marital	96	0.8	0.40	0	1
Education	96	12.09	3.39	0	16
Health Distance	96	933.33	1,093.87	50	5,000
BMI	96	27.76	4.24	19	40
Meals	96	3	0.43	2	4

According to Table 4.1, on average, 88% of the household reported to have been sick in the past three months with the standard deviation of 0.74. The minimum of total people ill was 0 meaning that some of the respondents reported to have no incidence of morbidity in their households in last three months. The maximum value of occurrence of morbidity was 3 indicating little bit higher level of illness among some of the respondents. Most of the diseases were reported to cover CVDs and infection diseases.

In term of mortality the study found that, on average 66% of the households experienced an incidence of death among the members of the household in the past one year with a standard deviation of 0.76. The minimum of total people die within one year ago among the sample were 0 meaning that some of the respondents reported to have non incidence of death in their households. The maximum value of mortality incidence was 3 indicating higher mortality among some of the respondent's household.

On average, household's life expectancy at birth was 46 years with 10.08 standard deviation. The maximum and minimum values of life expectancy were 24 years and 79 years respectively, with an average income of 408,125 Tsh per month among the samples, standard deviation was 197,965 Tsh, minimum and maximum income among respondents were 150,000 Tsh and 1,200,000 Tsh respectively.

The mean ages of the respondents were 40.47 years with 11.34 standard deviation while its minimum and maximum value were 20 years and 79 years respectively. The average number of years of schooling according to the statistics found to be 12 years meaning O level stage of education with 3.39 standard deviation. The variable also observed to have zero years of schooling as a minimum value of education and 16 years of schooling meaning university level as maximum value of education.

The mean of distance from a health facility was 933.33meters from a household's house with 1,093.87meters standard deviation while the minimum and maximum values were 50meters and 5,000meters respectively. For BMI, its mean was 27.76 larger than the healthy standard range of 18-25, standard deviation was 4.24 while 19 and 40 were minimum and maximum value of BMI of the respondents. The mean of meal approximated to have 3 meals per day with 0.43 standard deviation. The minimum number of meals were 2 and maximum number of meals taken per day were 3 by the respondents respectively.

The statistics also show that, 78% of the respondents used in data collection were male and the rest 22% were female. Also, in these households, 80% were married and 20% were non married.

Generally, the mean of the variables seemed to be lager compared to their standard deviation of each individual variables. However, standard deviations of all variables used in the models are moderately low range from 0.40 to 11.34 with the exception of income and distance of health care since they used aggregate data in their estimation. This implies that, the sample collected were larger in size rational for regression estimation. Also, the range of deviation between maximum and

minimum of each individual variable seemed not far apart. Moreover, the mean of the most variables were displayed to doubled over its standard deviation representing normality distribution of the variables.

4.2 Estimation results

The main objective of this study was to examine the relationship between health status and income with other selected socioeconomic determinants like age, gender, accessibility of health care, BMI, meals intake and education. However, in estimating health status the researcher categorized health status in three proxies as dependent variables such as morbidity, mortality and life expectancy. The seemingly unrelated regression was estimated and results were extracted for each dependent variable and explained as follows:

4.2.1 Relationship between household's income and morbidity

Table 4.2.1 shows the results of the first objective from the seemingly unrelated regression estimation on determining the relationship between household's income and morbidity.

Table 4.2.1 Estimation results of the relationship between morbidity and income

Morbidity	Coefficients	Std. err	Z	P>[z]	[95% conf . Interval]	
Constant	0.6719	0.7498	0.90	0.370	-0.7977	2.1415
Dummy of income	0.4949*	0.1468	3.37	0.001	0.2071	0.7827
Age	-0.0086	0.0067	-1.29	0.197	-0.0217	0.0044
Dummy of gender	-0.2086	0.1884	-1.11	0.268	0.5779	0.1606
Dummy of Marital status	0.2775	0.2083	1.33	0.183	-0.1307	0.6858
Education level	-0.0417*	0.0212	-1.97	0.049	-0.0833	-0.0001
Health distance	-0.0005	0.0006	0.78	0.435	0.0007	0.0001
BMI	0.0040	0.0170	0.24	0.811	-0.0294	0.0375
Meals	0.2201	0.1613	1.36	0.172	-0.0961	0.5363
R Square (0.1509)						
F test chi square (17.06) P (0.0295)						

Note: * and ** refer to significant levels at 5 and 10 percent respectively.

From Table 4.2.1 the results of morbidity model demonstrate that, only income and education were significant at 5% significance level and all other variables were insignificant. Based from the data, income has positive relationship with the number of people ill of the households probably associated with infection and cardiovascular diseases like dysentery, malaria, HIV/AIDS, diabetes, stroke, cancer, heart diseases and pulmonary air bone diseases respectively as postulated by Grossman, (1972) due to poor health protective for the poorer and poor preventive instruments for the richer. In that case, health status estimated to change positively by 49.49% from one unit increase of income of the rich compared to the income of the poor households holding other socioeconomic variables constant.

In term of education, the increase of a one year of education reduces the rate of illness of the households by 4.2% as expected.

However, in this morbidity model, age, gender, marital status, distance of health facility from the household's house, BMI and meals intake per day were found to be insignificant since they have higher p-values than the significance level.

4.2.2 Relationship between mortality and household's income

Table 4.2.2 below shows the results of the second objective of this study from the seemingly unrelated regression estimation on determining the relationship between household income and mortality.

Table 4.2.2 Estimation results on relationship between mortality and income

Mortality	Coefficients	Std. err	Z	P>[z]	[95% conf . Interval]	
Constant	-0.7715	0.8021	-0.96	0.336	-0.3436	0.8005
Dummy of income	0.3324*	0.1570	2.12	0.034	0.0245	0.6403
Age	-0.0033	0.0071	-0.47	0.637	-0.0174	0.0106
Dummy of gender	0.0322	0.2015	0.16	0.873	-0.3628	0.4272
Dummy of Marital status	-0.1152	0.2228	-0.52	0.605	-0.5519	0.3215
Education level	-0.0106	0.0227	-0.47	0.639	-0.0551	0.0338
Health distance	0.0002	0.0006	0.30	0.763	-0.00011	0.00012
BMI	0.0326**	0.0182	1.79	0.074	-.0031	0.0685
Meals	0.2447	0.1725	1.42	0.156	-0.0935	0.5830
R Square (0.0968)						
F-test chi square 10.29 P (0.2452)						

Note: * and ** refer to significant levels at 5 and 10 percent respectively.

From this model, only income and BMI were significant at 5% and 10% significance level respectively. Household's income was found to have positive relationship with mortality since estimated income coefficient has positive sign. Based from the model, the mortality rate will increase positively by 33% from one unit increase of income of the rich compared to the income of the poor holding other variable constant. The increase of the mortality is probably due to unhealthy behaviours.

Also, the increase of BMI from normal range by one unit, increase the probability of death by 3.3% as was expected based from the theory holding other variables unchanged. This means that, unhealthy behaviours particular higher sedentary life of improper eating styles, extremely use of saturated fats and physical inactivity of the rich have positive relationship with mortality.

However, in this model, age, gender, marital status, education level, distances of the health facility and meals intake per day were insignificant as they have higher p-values than the level of significance at both 5 and 10 percent.

4.2.3 Relationship between life expectancy and household's income

The following table provides the results of the third objective on determining the relationship between household income and life expectancy.

Table 4.2.3 Estimation results on relationship between life expectancy and income

Life expectancy	Coefficients	Std. err	Z	P>[z]	[95% conf . Interval]	
Constant	22.8906	7.5966	3.01	0.003	8.0015	37.7797
Dummy of income	0.9133	1.4876	0.61	0.539	-2.0024	3.8291
Age	0.6382*	0.0678	9.40	0.000	0.5052	0.7713
Dummy of Gender	-0.0012	1.9090	-0.00	0.999	-3.7428	3.7404
Dummy of Marital status	-4.5040*	2.1103	-2.13	0.033	-8.6402	-0.3678
Education level	0.0623	0.2151	0.29	0.772	-0.3592	0.4840
Health distance	-0.0012**	0.0006	-1.84	0.066	-0.0025	0.0008
BMI	0.0403	0.1731	0.23	0.816	-0.2991	0.3797
Meals	-0.1043	1.6346	-0.06	0.949	-3.3082	3.0994
R Square (0.5337)						
F-test chi square 109.86 P (0.0000)						

Note: * and ** refer to significant levels at 5 and 10 percent respectively.

The life expectancy model, it shows that, income, education, gender, BMI, meals were all insignificant while only age, marital status and distance from a health facility were significant on determining the relationship between income and life expectancy according to the estimation data as depicted on Table 4.2.3.

From the model, age was observed to have positive relationship with life expectancy as was expected, since according to the theories, the increase of age relate with longevity of life expectancy. Thus, increasing of household's age by one year holding other variables constant increase the probability of longevity of life expectancy by 64%.

According to the estimation model, being married observed to have negative sign contrary to what was expected. Meaning that being in a marriage reduce the probability of higher life expectancy by 50% compared to those households who are out of marriage. Based from the theories, being married increases the probability of higher life expectancy with happy life as it reduced ill health risks like unsafe sex, improper eating styles and loneliness stresses.

Lastly, distance of the household's house from the health facilities found to have negative sign as was expected. Meaning that decreasing of a distance of household's house by one kilometer from the health care facilities increase the probability of higher life expectancy by 0.1% compared to those household's house who live far away from the health care facilities. Since, it will ensure easily and timely accessibility of quality medical services.

However, according to the results, income, education, gender, BMI and number of meals intake per day were all insignificant because their p-values were greater than the significance level of both 5% and 10% respectively.

4.3 Post estimation results

In order to ensure that the data estimated were reliable, several post estimation were performed in this study which are explained as follows:

4.3.1 Skewness and Kurtosis test

On average, if skewness is positive, the data are positively skewed or skewed right, meaning that the right tail of the distribution is longer than the left. If skewness is negative, the data are negative skewed or skewed left, meaning that the left tail is longer. And if skewness = 0, the data are perfectly symmetrical. But a skewness of exactly zero is quite unlikely for real world data.

However, Bulmer (1979) suggests three rules of thumb is that, first if skewness is less than -1 or greater than $+1$, the distribution is highly skewed. Second, if skewness is between -1 and $-\frac{1}{2}$ or between $+\frac{1}{2}$ and $+1$, the distribution is moderately skewed. And third, if skewness is between $-\frac{1}{2}$ and $+\frac{1}{2}$, the distribution is approximately symmetric. Hence, the results of Skewness showed the variables to be around $-1/2$ and $+1/2$ confirming that data were approximately symmetric and not skewed as table 4.3.1 depicted. For kurtosis, value of any univariate normal distribution is 3. However, distributions with kurtosis less than 3 are said to be platykurtic (little flat), though this does not imply the distribution is flat topped. Rather, it means the distribution produces fewer and less extreme outliers but it is still normal distributed.

Table 4.3.1 Skewness and Kurtosis test

Variable	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2(2)
Morbidity	0.0018	0.0616	11.16	0.0038
Mortality	0.0019	0.5636	8.78	0.0124
Life expectancy	0.4075	0.4643	1.25	0.5352
Income	0.0000	0.0002	30.46	0.0000
Age	0.0150	0.4211	6.18	0.0454
Gender	0.0000	0.9867	16.95	0.0002
Marital status	0.0000	0.3650	19.90	0.0000
Education level	0.0017	0.0155	12.95	0.0015
Distance	0.0000	0.0048	27.61	0.0000
BMI	0.0543	0.3934	4.51	0.1048
Meal	0.0048	0.0761	9.59	0.0083

4.3.2 Shapiro Wilkes normality test

According to Shapiro normality test, the null-hypothesis formulated population is normally distributed. Thus, if the p-value is less than the chosen alpha level of 0.5 then the null hypothesis is rejected. On the contrary, if the p-value of the Shapiro is greater than the chosen alpha level, then the null hypothesis that the data are normally distributed is not rejected. Thus, according to the Shapiro results, it was concluded that, the data were normal distributed since the p-value of all variables were greater than the chosen significance level as depicted in table 4.3.2.

Table 4.3.2 Shapiro Wilkes normality test

Variable	Observation	W (p-value)	V	z	Prob>z
Morbidity	96	0.95517	3.577	2.821	0.00239
Mortality	96	0.93115	5.494	3.771	0.00008
Life expectancy	96	0.98642	1.084	0.178	0.42948
Income	96	0.86573	10.715	5.249	0.00000
Age	96	0.96752	2.592	2.108	0.01751
Gender	96	0.95799	3.353	2.678	0.00371
Marital status	96	0.93988	4.159	3.155	0.00026
Education level	96	0.88302	9.336	4.944	0.00000
Distance	96	0.73619	21.053	6.744	0.00000
BMI	96	0.98201	1.436	0.801	0.21169
Meal	96	0.92708	5.819	3.898	0.00005

4.3.3 Endogeneity test

In statistics, an endogeneity problem occurs when an explanatory variable is correlated with the error term. It can arise as a result of measurement error, autoregression with autocorrelated errors, simultaneity/causality and omitted variables. But in our case, there is a causality relationship between health status and

income. Income is used in improving health status and good health facilitates in generating of more income, in this case income has a probability of endogeneity problem. The aim of this test was to test whether the income variable was free from endogeneity problem or not for the sake of avoiding biased estimate since it violates assumption of covariance that $cov(x,u) = 0$.

In testing the endogeneity, the models were estimated using instrumental variable regression by applying Two Stage Least Square method (2SLS) for WU Hausman endogeneity test. We took health insurance as instrument of income because about 90% of people in Urban district depend on health insurances in obtaining quality health care services in private hospitals compared to the public hospitals. Therefore, since their health services depend mostly from the status of holding health insurance, the researcher selects it as instrument of income. The null hypothesis of endogeneity test is that, the variable is exogeneous where the rule of thumb is that if the probability of the Hausman test is greater than the significant level we accept null hypothesis that the variable is exogeneous and vice versa. The results depict that, in all three proxies, income was found to be exogeneous since their probability of Hausman test was greater than the significance levels of both 5% and 10% as depicted on Appendices iii, iv and v. Hence, the study concludes that SURE was the right model for estimation.

However, in order to have a viable and correctly specified instrument for testing Hausman endogeneity test, instrumental viability test using first stage regression was tested. The results also demonstrated on the appendices that the instrument set was valid since the F probabilities of all models were greater than the critical value though, was at 25% level of significance. The over identification test was not applied since the test (endogeneity test) used only one instrument.

The WU Hausman endogeneity test is widely used in econometric on the simultaneity relation among variables. The vivid example could be traced from the current study conducted by Savage et al (2014) in Tanzania on the analysis of the relationship between income and health. Savage analysed income derived from

rainfall agriculture fed as predictor in determined its relationship with health status among households in Kagera. Due to the presence of causality biased of income, Savage et al (2014) used meteorological data for rainfall prediction in execution of agriculture production as instrument of income in testing endogeneity since most of the households in the region depend their income from the agricultural rainfall fed.

The other example can be portrayed from Card (2001) who estimated education and returns of schooling in United State. Hence, education and returns of schooling are affecting on each other (simultaneity biased). Therefore, Card (2001) used three instrumental variables on the supply side of returns of schooling as alternative to returns of schooling in testing WU Hausman endogeneity test. These variables were (1) minimum school leaving age; (2) tuition or education cost and (3) type of school or college where studies completed to be re-estimated on second regression using instrumental variable regression (IV).

4.3.4 Heteroskedasticity test

In seemingly unrelated regression equation, the variation of error terms according to Gujarati (2004) is tested using Breusch-Pagan test.

Using this test, if the value of the Breusch–Pagan is low against the chi-square value from the X^2 table in respect to the relative degree of freedom on a given level of significance, than indicating heteroskedasticity was not present and vice versa. As a result, the models were tested and the probability of the Breusch–Pagan over all three models were low than the 8 degree of freedom critical chi-square value at the 5 percent level which is 15.5073 suggesting no variations of error terms among observations as table 4.5 depicted.

Table 4.3.4 Breusch-Pagan Test of independent errors

Correlation Matrix of Residuals	Morbidity	Mortality	Life expectancy
Morbidity	1.0000		
Mortality	0.0125	1.0000	
Life expectancy	0.0988	-0.1983	1.0000
BPT : $\chi^2(3) = 4.728$, Pr = 0.1929, df = 8, Critical Value $X^2 = 15.5073$			

4.3.5 Correlation matrix analysis

In seemingly unrelated regression, testing multicollinearity using Variance Inflation Factor (VIF) is not possible as the method involves more than one equation during the estimation. Therefore, the researcher used correlation matrix analysis to determine the strength of correlation among the independents variables.

Correlation is used to show whether and how strongly pairs of variables are related. It measures the linear relation between two or more variables. In order to evaluate the correlation between independents variables, it is important to know the magnitude or strength that range from -1.0 to +1.0. the closer coefficient is to +1 or -1, the more closely the two variables are related and hence mark the evidence that multicollinearity problem is present and vice versa is true. The value of -1.0 represents a perfect negative correlation while a value of +1.0 represents a perfect positive correlation. A value of 0.00 represents a lack of correlation. Again, if coefficient is positive, it means that as one variable gets larger the other gets larger too. On the other hand, if it is negative, it means that as one gets larger, the other gets smaller (inverse correlation).

Table 4.3.5 Correlation of the studied variables

Variables	Age	Gender	Marital	Edu	Distance	BMI	Meals	Dhincome
Age	1.0000	0.0671	0.2667	0.0540	-0.1085	0.1143	0.0799	0.1902
Gender	0.0671	1.0000	0.4328	0.0817	0.0208	0.1012	-0.2528	-0.0252
Marital	0.2667	0.4328	1.0000	0.1838	0.0332	0.1513	-0.2320	-0.0261
Edu	0.0540	0.0817	0.1838	1.0000	-0.0081	-0.0181	0.0424	0.1509
Distance	-0.1085	0.0208	0.0332	-	1.0000	0.1565	-0.0714	0.0507
BMI	0.1143	0.1012	0.1513	-	0.1565	1.0000	-0.1806	0.1159
Meals	0.0799	-0.2528	-0.2320	0.0424	-0.0714	-0.1806	1.0000	-0.1338
Income	0.1902	-0.0252	-0.0261	0.1509	0.0507	0.1159	-0.1338	1.0000

The results are presented on table 4.3.5 where the correlation analysis shows the correlation among all variables in all three equations are quite low closer to +0.00 or -0.00 which implies that, the problem of multicollinearity could not exist. The highest correlation value was 0.4328 between gender and marital status which is still the required range.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0 Introduction

The major aim of this study was to examine the relationship between household income and health status. The chapter presents findings of the relationship between households income and health status via three health proxies such as morbidity, mortality and life expectancy as per studied objectives.

5.1 Interpretation of the findings

The coefficient determination (R^2) of the models estimated showed variation on each other, since it involves different dependent variables. Morbidity model has been explained by independent variables by 15%. Mortality has been explained by 10% and lastly life expectancy model explained by 53%. An average of about 73% of the independent variables has not been explaining the dependent variables in these three models because income and the selected socioeconomic determinants were not conclusive factors in determining the relationship between household's income and health status since, there are several other factors as discussed in chapter two. The results across the models depict that, income contribute in determine health status as explained by Grossman (1972), since, they have expected positive signs on the income coefficients across the three models as depicted on table 4.2.1, 4.2.2 and 4.2.3. Therefore, as income increase morbidity, mortality and life expectancy are also increasing.

5.1.1 The Relationship between household's income and morbidity

According to the results of morbidity model, only income and education were significant at 5% significance level and all other variables were insignificant. Further results showed income coefficient have positive sign with the number of people ill meaning that, one percentage increase in income would stimulate the rate of illness among households by 49.49%. This incidence of higher rate of diseases is probably due to the increase of unhealthy behaviours among higher income groups which is

associated with prestige and reputation among the society but consequently increase the rate of diseases particular relating with HIV/AIDS and cardiovascular diseases like diabetes, stroke, cancer, heart diseases and pulmonary air bone diseases respectively as postulated by Grossman, (1972). Unhealthy behaviours might include severe smoking and alcoholic intake followed by unsafe sex, poor eating styles, over use of food additives like salts and sugar, junky foods, higher sedentary life with physical inactivity. More than three quarter of the respondents experienced to have several types of diseases in past three months. Hence, based from the descriptive statistics mentioned earlier, an average of about 88% of the households found to have been ill ranging from one to three times in the past three months.

In term of education, the increase of a one year of education above secondary level will reduce the rate of illness of the household by 4.2% as was expected since its coefficient is found with negative sign. Education helps to provide information to the households concerning health skills and awareness necessary in reducing the rate of poor health and fatalities respectively by minimizing or cessation of unhealthy behaviours and motivated in healthy behaviours like physical activities, proper diet intake, stress control, safe sex, sanitation and hygiene as well as the awareness on the extremely use of intoxication and food additives especial salt.

From the data, the average level of education were 12.09 years of schooling meaning the O level education is enough in understanding the worse of unhealthy behaviour on health status. However, the rate of illness among respondents was higher to an average of about 88% simply because the variation of education also matters on affecting health status. Since, those who major in health subjects like biology, psychology and nurse are healthier than those who major in accounts, math and geography. Though, the variable was significance at 5% level of significance.

However, in this model, age, gender, marital status, distance of health facility from the household's house, BMI and meals intake per day were found to be insignificant since they have higher p-values than the significance level. Meaning that, they are

not important in influencing the relationship between household's income and morbidity.

5.2 The Relationship between household's income and mortality

In term of mortality model, coefficients like age, gender and education observed to have negative sign except for income, BMI, health care distance and meals intake per day have positive sign with mortality. However, only income and BMI were significance at 5% and 10% respectively.

Based from the model, the mortality rate will increase by 33% from one unit increase in income to those who have higher income above 400,000 Tsh compared to those households with income less than 400,000 Tsh, holding other variable constant. This implying that, the increase of income of the households may facilitate the increase of unhealthy behaviours as said earlier for prestige, reputation and modernization as human natures. Consequently, this stimulates the rate of deaths and disability among the society due to negative health outcomes. From the data for instance 88% of the total samples suffered by diseases including mainly infections and cardiovascular diseases in past three months before the execution of this study as well as a total average of 66% of death incidences occurred among the households in past three years who have an average of 408,125 Tsh of income.

In the case of BMI, the increase of body mass index from normal range by one unit increase the probability of mortality by 3.3% as was expected based from the theory holding other variables unchanged. This implies that, the increase of BMI from healthy ranges (18-25) will increase the probability of multiple deadly cardiovascular diseases that are leading in causing fatalities among high income households like stroke, hypertension, pulmonary heart diseases, respiratory diseases, diabetes and obesity. Hence the study demonstrates that, wealthier individuals are also heavier than poorer persons, which is a health risk in itself and could also explain the higher blood pressure among the rich which is enough to trigger higher mortality rates. From the data, the average BMI observed was 27.76 which is above the normal range, that is why the percentage of morbidity and mortality rate is higher among the

studied sample which are 88% and 66% respectively. That means unhealthy behaviours such as smoking, alcoholic intake, exceedingly use of liquefied fats on foods, physical inactivity and higher sedentary life of the rich have positive relationship with mortality.

In this mortality model, age, gender, marital status, education level, distances of the health facility from the household's house and meals intake per day were insignificant as they have higher p-values than the level of significance. Meaning that, they have no any important in explaining the relationship between household's income and mortality rate.

5.3 The Relationship between household's income and life expectancy

In life expectancy model it shows that, income, age, education and BMI observed to have positive sign while gender, marital status, meals intake and health distance were found to have negative sign with life expectancy. However, only age, marital status and distance from a health facility were significant on 5% and 10% respectively.

Age was observed to have positive relationship with life expectancy as was expected, since according to the theories, increasing of age relate with longevity of life expectancy. Therefore, according to the estimation results, the increase of one year holding other variables constant, increase the probability of longevity of life expectancy by 64%.

In term of marital status, it was observed to have negative sign which was contrary to what was expected. Meaning that, being in a marriage reduce the probability of higher life expectancy by 50% compared to those households who are out of marriage. This is opposite to what was expected, hence being in a marriage according to theories reduce health risks by minimizing/cessation of unhealthy behaviours like unsafe sex, poor eating styles and stresses which are vital stimulus for cardiovascular diseases and HIV/AIDS respectively.

The increase of a distance of a health facility into a kilometer from the household's house decrease the probability of higher life expectancy by 0.1% compared to those households living near the health facilities as was expected. Hence, increasing of a distance from a health facility to the household increase the probability to the poor in lacking quality health care that might increase their probability of diseases or ill health as well as fatalities in such a way might lower their life expectancy as postulated from previous chapters.

However, according to the results, income, education, gender, BMI and number of meals intake per day were all insignificant because their p-values were greater than the significance level of both 5% and 10% respectively. This meaning that, the variables are not important in determining the relationship between household's income and life expectancy.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

6.1 Summary of the findings

The study examined the relationship between household's income levels and health status in Zanzibar.

In the study, cross-sectional primary data were used collected from 96 respondents in urban district. Seemingly Unrelated Regression was employed as the method of estimation. The study analysed Morbidity, Mortality and Life Expectancy as proxies for health status where income and some socioeconomic determinants like age, gender, marital status, education, distance from health care facility, BMI and number of meals taken per day were considered as predictors. Three specific objectives were (1) to investigate the relationship between morbidity rate and household income, (2) to examine the relationship between mortality rate and household income and (3) to investigate the relationship between life expectancy and household income were analysed.

The findings reveal that, on average, household's income was found to have positive correlation with health status in one context or another but its significance varies among health proxies. Based from the first objective, household income was found to have positive correlation with morbidity. According to the results, income was observed to have positive sign, meaning the increase of income by 1% will increase the rate of morbidity by 50%. The variable was significant when tested at 5% level of significance implying that, it is important in influencing morbidity level of the households.

In the second objective, household's income showed to have a positive sign with mortality indicating that, increasing of income increase the rate of mortality by 33%. The variable was significant at 5% meaning that, it is essential in explaining the relationship between household's income and mortality rate among the households.

When examining the relationship between income and life expectancy, household's income indicates to have positive correlation. However, when testing the variable, it had been found to be statistically insignificant implying that income is not important in explaining the variations in life expectancy.

6.2 Conclusion

Doubtless, demographic transitions bring multiple health hazards in the world and not only in developed countries but also in poor countries like that of Tanzania. Increasing of income over the globe, widen inequality gap between the rich and the poor hence, increase consequences on life expectancy, morbidity and mortality particular on infection diseases, HIV/AIDS and cardiovascular diseases. Since the rich suffer due to their unhealthy behaviours and the poor suffer due to their extreme poverty.

The first objective on the relationship between income and morbidity diagnosed to have positive correlation implying that, increasing of the income tend to increase the rate of illness among the households especially those related with cardiovascular diseases and HIV/AIDS. Though, the variable when tested was significant.

In the case of second objective that required the investigation on the relationship between household income and mortality rate, results demonstrated to have positive correlation among the two. This meaning that, income affects the number of deaths among the household as the rich are affected due to their unhealthy behaviours and the poor due to their poverty. Yet, the variable was significant.

Lastly, the relationship between income and life expectancy was found to have positive correlation. Meaning that, the increase of income will increase life expectancy. However, the variable was insignificant in explaining life expectancy.

In general, income found to have positive sign with health status. This implying that, increase in household's income increase health status of the households.

6.3 Policy implications

According to the finding of this study, income was found to have positive correlation with health status. This meaning that, increasing of the income encourages higher morbidity, mortality and life expectancy among individuals or communities due to demographic changes occurred from 1980s to 2000s that brought many consequences on health outcome.

In this circumstance therefore, the government has to interfere on the existence initiatives to control the burden particular on these morbidity and mortality on cardiovascular diseases and HIV/AIDS in the country. Beside the several initiatives that have been put in place in the efforts of minimizing/eradicating the impacts like expansions of cardiac institutes in regional and referred hospitals like Mwanza-Bugando, Morogoro and Kigoma, mass publication on cardiac, raising of health sector budget as well as the inauguration of the first ever heart institute in East Africa at Muhimbili Hospital known as the Jakaya Kikwete Cardiac Institute (JKCI) in 2015 that establish bypass surgery (cardiac surgery without operation). Still, there is a need by the government to focus more on policy reformulation and programmes using tax and fine systems, banning rules and Physical Education to both primary and secondary education by involving multi-sectors framework like health, education, labour, employment and agriculture for the purpose of reducing exposure to extremely tobacco and alcoholic intake, unsafe sex as well as by promote healthy diet, habitually health check up and physical activity behaviours through sports and games like HIV/AIDS, Malaria and Cardiac commemoration, national wise institutional sports and games like SHIMIWI, BAMATA, UMISSETA and UMITASHUMTA to produce healthy society free from diseases, energetic and productive for economic growth as postulate by Grossman.

Also, the government has to reformulate policies targeting in minimizing income inequality between the rich and the poor by increase income distribution using viable economic and social policies and programs targeting in increasing income and services to the poor by subsidizing education and health services over the country via national health security so that they could afford and manage quality medical

services, nutrients food for healthy diet and improving their living environment for better sanitation and hygiene respectively in the efforts of reducing the rate of morbidity and mortality of infection diseases, HIV/AIDS and cardiovascular diseases in particular.

6.4 Recommendations

Based from the findings of this study, where income is found to have positive correlation with health status, specifically to morbidity and mortality, the government needs in a long run, to investigate the problem acutely with their relevant causality via scientific researches in collaboration with health stakeholders, referred hospitals and other socioeconomic research institutes for greater understanding on the sources of the issue and ways to mitigate the problems since health is a multidimensional aspect for human and economic development. In a short run, the government has to minimize income inequality by increase income distribution and asset ownership using viable economic policies and programs targeting in increasing income and services to the poor so that they could afford and manage quality medical services, education, nutrients food for healthy diet and improving their living environment for better sanitation and hygiene respectively.

Lastly, the government with these organizations using participatory tools has to inform the mass on the importance of modifying their life styles on minimizing/cessation of tobacco and alcoholic intake, proper eating styles and stress management, reduce the use of extreme salts, sugar and saturated fats, insisting in better sanitation and hygiene, safe sex as well as emphasizing on physical activity and not only targeting the higher income groups but also to the low income households. By doing these, the society might be able to reduce the rate of morbidity and mortality and hence increase the rate of life expectancy as demonstrated from the finding of this study.

6.5 Limitation of the study

The study was encountered by several constraints particularly on readiness and willingness of some respondents in providing information, since some respondents experienced to hide some information particular those related with health and income. Also, the data were collected during the second phase of a general election of Zanzibar in March, 2016 after results of the first election of 20 October, 2015 been withdrawn by the chairperson of the Zanzibar Electoral Committee (ZEC). The stiff political hostile between Chama cha Mapinduzi (CCM) and Civic United Front (CUF) in Zanzibar and rushes of the security organs, made people to ignored and disregard the program in such away affected the quality of the study hence people linked the program (research) with political affairs. Despite all these limitations, the researcher managed to collect sufficient data for the study.

6.6 Areas for further study

Based on the nature of the findings and literature review as discussed in chapter two and chapter five, there are a lot of gaps that need to be scrutinized regarding the relationship between income and health status. Since, the findings are only relevant on the relationship between income and health status at a small area of Zanzibar. Other researches can be done specifically focusing on other socioeconomic determinants by considering special groups like elderly, teens, children and gender based analysis in relation to development/income with health status over the whole Tanzania.

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APPENDICES

APPENDIX I: QUESTIONNAIRES GUIDE FOR THE HOUSEHOLDS

Dear Respondents

I am Hafidh Hassan Bhai, a student of Mzumbe University pursuing a Master of Science in Economics majoring in Planning and Policy.

This questionnaire is designed to collect information for academic purpose only, the study is aimed at making Analysis of the Relationship between Household Income and Health Status in Zanzibar.

Kindly complete the questionnaire by ticking the appropriate response or by inserting your answers in the spaces provided. All of the answers you give will be confidential and will not be shared with anyone other than on this study.

To maintain the anonymity and confidentiality, please do not write your name.

PART A: General Characteristics

1. Where is your place of residence?

.....

2. What is the shehia of your Residence

.....

3. Who is the head of household?

i. Male () ii. Female ()

4. What is the age of the head of household?

.....

5. What is your marital status?

i. Single () ii. Married ()

iii. Widow () iv. Divorced ()

6. How many members do you have in your household?

7. What is your education level?
 i. No formal education () ii. Primary education ()
 iii. Secondary education () iv. University education()
8. What is your employment status?
 i. Employed () ii. Self employed ()
 iii. Unemployed () iv. Retired ()
9. If employed, who is your employer?
 i. Government () ii. Private ()
 iii. Self employed ()
10. What is your occupation?

PART B: Information about Morbidity

11. In the past 24 hours, how many different kinds of medication have you taken?

12. Did any member of your household get ill in past three months?
 i. Yes () ii. No ()
13. If yes, how many household's members were ill?

14. What type of disease did they suffer from?

15. Is there any member of your household suffering from chronic diseases?
 i. Yes () ii. No ()

16. If yes, what type of chronic diseases does a member of your household suffered from?

17. How many members of a household suffering from chronic diseases?

18. What is the sex of a household member suffering from chronic diseases?

i. Male () ii. Female ()

19. Have you ever affected by shortness of breath?

i. Yes () ii. No ()

20. If yes, please circle the number describe the rate of your shortness?

0 No shortness of breath	1	2	3	4	5 Severe shortness of breath
--------------------------------	---	---	---	---	---------------------------------

21. How much time during the past one week? Circle the number.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Were you discouraged by your health problems?	1	2	3	4	5
Were you fearful about your future health?	1	2	3	4	5
Were frustrated by your health?	1	2	3	4	5

22. In general, how would you rate your health at a present time?

i. Excellent () ii. Good () iii. Fair ()
 iv. Poor () v. Very poor ()

PART C: Information about Health Care Accessibility

23. Do you have a health insurance?

- i. Yes () ii. No ()

24. Is there a health care facility in your area?

- i. Yes () ii. No ()

25. If yes, how far is it situated from your household's house in meters?

.....

26. If you were to go to the hospital, how would you go there?

- i. Car/motorcycle () ii. Walking ()
iii. Public Transport () iv. Bicycle ()

27. How would you rate the local hospital in your area?

- i. Excellent () ii. Good ()
iii. Fair () iv. Poor ()

28. How many times do your household's members go to health care per week?

.....

29. What type of gender frequently goes to the health care facility?

.....

30. Do you watch television?

- i. Almost every day () ii. Once a week ()
iii. Less than once a week () iv. Not at all ()

31. Do you listen to the radio?

- i. Almost every day () ii. Once a week ()
iii. Less than once a week () iv. Not at all ()

32. Do you read a newspaper or magazine?

- i. Almost every day () ii. Once a week ()
iii. Less than once a week () iv. Not at all ()

33. In past one year, has any one come in your dwelling for spraying vaccination?

- i. Yes () ii. No ()

34. Does your household have any mosquito nets?

- i. Yes () ii. No ()

PART D: Information about Mortality

35. Are there any household members who were reported to have died last year?

- i. Yes () ii. No ()

36. If yes, how many members of the households died last year?

.....

37. What type of diseases are said to be the cause of most deaths?

.....

38. At what age did the member of your family die?

.....

39. What is the gender of the eldest member of the household?

.....

40. What is the age of the eldest member of the household?

.....

41. Are there any inherited diseases in your family?

- i. Yes () ii. No ()

42. If yes, what type of that disease?

- i. Asthma ()
- ii. Diabetes ()
- iii. Cancer ()
- iv. Sickle cell ()
- v. Others (specify).....

PART F: Information about Lifestyle

43. Do you do physical exercise in your household?

- i. Yes ()
- ii. No ()

44. If yes, how many time per week you do physical exercise?

.....

45. What is your purpose of doing physical exercise?

.....

46. What is your body weight?

.....

47. What is your body height?

.....

48. Have you ever test for hypertension?

- i. Yes ()
- ii. No ()
- iii. Don't know ()

49. If yes, what was the result?

.....

50. Have you ever test for diabetes?

- i. Yes ()
- ii. No ()
- iii. Don't know ()

51. If yes, what was the result?

.....

52. Have you ever test for HIV?

- i. Yes () ii. No ()
iii. Don't know ()

53. If yes, what was the result?

- i. Positive () ii. Negative ()

54. Does anyone smoke in your household?

- i. Yes () ii. No ()

55. Does smoking contribute to lung cancer?

- i. Yes () ii. No ()

56. Does anyone drink alcohol in your household?

- i. Yes () ii. No ()

57. Does alcoholic contribute to overweigh and hypertension?

- i. Yes () ii. No ()

58. How many meals does your household usually eat per week?

- i. One meal () ii. Two meals ()
iii. Three Meals () iv. More than three ()

59. Do you eat fruits in your meals?

- i. Yes () ii. No ()

60. In past week, how many days did your household eat meat or fish?

- i. Days ()

61. If no, why?

.....

62. What is your favorite cooking style of fish or meat?

- i. Frying () ii. Roasting ()
iii. Baking () iv. Boiling ()

63. Did your household use oil for cook with in the past 7 days?

- i. Yes () ii. No ()

64. If yes, what kind of oil was used?

- i. Coconut oil () ii. Sunflower ()
iii. Ghee () iv. Other(specify).....

65. Where did you get that oil?

- i. Home processed () ii. Local mil ()
iii. Bought () iv. Other ()

66. How often in past year did you have problems in satisfying the food needs of the household?

- i. Never () ii. Seldom ()
iii. Sometime () iv. Often ()
v. Always ()

PART G: Information about Income

67. Does the house belong to the household?

- i. Yes () ii. No ()

68. If yes, how would you best describe your house?

- i. Excellent () ii. Good ()
iii. Fair () iv. Poor ()

69. How many rooms in your household are used for sleeping?

- i. Number of rooms ()

70. What type of fuel does your household mainly use for cooking?

- i. Electricity/Gas () ii. Charcoal ()
iii. Paraffin () iv. Firewood ()

71. What is the main source of energy for lighting in the household?

- i. Electricity/Gas () ii. Candle ()
iii. Paraffin () iv. Firewood ()

72. What type of floor does your house have?

- i. Tiles () ii. Earth ()
iii. Cement () iv. Wood ()

73. What materials do your walls contains?

- i. Stone Walls () ii. Bricks Walls ()
iii. Mud Walls () iv. Wood Walls ()

74. What kind of toilet facility do members of yours household usually use?

- i. Flash Toilet () ii. Pit Latrine ()
ii. Bucket () iv. No Facility ()

75. Do you share this toilet facility with other households?

- i. Yes () ii. No ()

76. If yes, how many households use this toilet facility?

- i. Number of households ()

77. What is the main source of drinking water for members of your households?

- i. Piped water () ii. Dug well ()
iii. Spring () iv. Tanker Truck ()

78. Who is providing water at your home?

- i. Government () ii. Private operator ()
ii. NGO () iv. Don't Know ()

79. Where is that water source located?

- i. In own dwelling () ii. Out of own dwelling ()

80. If out of dwelling, how long does it take to go and back in finding water?

- i. Minutes () ii. Don't know ()

81. How much do you spend for food per month?

.....

82. What is the total expenditure in your household per month?

.....

83. Does the increasing of your income contribute for your good health?

- i. Yes () ii. No ()

84. If yes, mention how?

- a)
b)
c)

APPENDIX II: INTERVIEW GUIDE FOR HEALTH SPECIALISTS

PART A: Personal Information

1. Institution/Division.....
2. Nature of your employment.....
 - i. Permanent ()
 - ii. Temporally ()
3. Title.....
5. Gender.....

PART B: Community Health Information

6. In your experience, does the Zanzibar community care (invest) for their health?
 - i. Yes ()
 - ii. No ()
7. Do Hospitals provide health skills to the public?
 - i. Yes ()
 - ii. No ()
8. If yes, are they enough?
 - i. Yes ()
 - ii. No ()

What are the responses of the health skills program to public?

9. What are CVDs?
10. What are the sources of CVDs?
11. What are the possible causes of CVDs?
12. What type of gender suffers more from CVDs? Why?
13. What is the rate of diagnosis of CVDs per day?
14. Is the Zanzibar community aware of cardiovascular diseases?
15. Does income matter on affecting individual health? How?
16. How Zanzibar lifestyles affect people's health?
17. Is a poor health influenced by poverty? How?

18. Is a good health influenced by higher income? How?
19. Why do rich people suffer more from CVDs?
20. Do the poor also suffer from CVDs? How?
21. What are the common diseases that the higher income people in Zanzibar suffer from? Why?
22. What are the common diseases that the lower income people in Zanzibar suffer from? Why?
23. What are the common child diseases in Zanzibar?
24. Does the child diseases relate with poverty/higher income?
25. Does the eating style affect community health? If yes, how?
26. Is HIV/AIDS infection relates with income/poverty?
27. What is the status of HIV/AIDS in Zanzibar?
28. Does individual income/poverty contribute to HIV/AIDS infections? How?
29. Is the medical system in Zanzibar enough to serve the entire population?
30. What is the average distance of medical facility from the people's residences?

**APPENDIX III: HAUSMAN ENDOGENEITY TEST RESULTS –
MORBIDITY**

```
. ivregress 2sls Morbidity Age Dgender Dmaritals1 edu disthealth BMI Meal (dhir
> come = dins)
```

```
Instrumental variables (2SLS) regression                Number of obs =      96
                                                       Wald chi2(8) =       7.32
                                                       Prob > chi2 =      0.5022
                                                       R-squared =        0.1039
                                                       Root MSE =        .69496
```

Morbidity	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
dhincome	.8336111	.6017929	1.39	0.166	-.3458813	2.013104
Age	-.0122434	.0092542	-1.32	0.186	-.0303812	.0058944
Dgender	-.1910335	.1959455	-0.97	0.330	-.5750796	.1930126
Dmaritals1	.3466931	.2448401	1.42	0.157	-.1331847	.8265709
edu	-.0508497	.026832	-1.90	0.058	-.1034395	.0017402
disthealth	.0000416	.0000686	0.61	0.544	-.0000928	.000176
BMI	.0010001	.0183484	0.05	0.957	-.034962	.0369623
Meal	.2894002	.2041407	1.42	0.156	-.1107081	.6895086
_cons	.5939374	.7819312	0.76	0.448	-.9386197	2.126494

```
Instrumented: dhincome
Instruments: Age Dgender Dmaritals1 edu disthealth BMI Meal dins
```

```
. estat endog
```

```
Tests of endogeneity
Ho: variables are exogenous
```

```
Durbin (score) chi2(1) = .356691 (p = 0.5503)
Wu-Hausman F(1,86) = .320728 (p = 0.5726)
```

```
. estat firststage
```

```
First-stage regression summary statistics
```

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	F(1,87)	Prob > F
dhincome	0.1713	0.0951	0.0628	5.83372	0.0178

Minimum eigenvalue statistic = 5.83372

Critical Values # of endogenous regressors: 1
Ho: Instruments are weak # of excluded instruments: 1

	5%	10%	20%	30%
2SLS relative bias		(not available)		
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53

**APPENDIX IV: HAUSMAN ENDOGENEITY TEST RESULTS –
MORTALITY**

```
. ivregress 2sls Mortality Age Dgender Dmaritals1 edu disthealth BMI Meal (dhir
> come = dins)
```

```
Instrumental variables (2SLS) regression                                Number of obs =      96
                                                                    Wald chi2(8) =       4.84
                                                                    Prob > chi2 =      0.7746
                                                                    R-squared =         .
                                                                    Root MSE =       .88909
```

Mortality	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
dhincome	-.7662426	.7698946	-1.00	0.320	-2.275208	.742723
Age	.0082804	.0118392	0.70	0.484	-.0149239	.0314848
Dgender	-.0249415	.2506799	-0.10	0.921	-.516265	.466382
Dmaritals1	-.33955	.3132325	-1.08	0.278	-.9534744	.2743743
edu	.0188079	.0343272	0.55	0.584	-.0484721	.0860878
disthealth	.0000506	.0000877	0.58	0.564	-.0001213	.0002226
BMI	.0426912	.0234737	1.82	0.069	-.0033164	.0886988
Meal	.020075	.2611642	0.08	0.939	-.4917975	.5319475
_cons	-.5186165	1.000352	-0.52	0.604	-2.47927	1.442037

```
Instrumented: dhincome
Instruments: Age Dgender Dmaritals1 edu disthealth BMI Meal dins
```

```
. estat endog
```

```
Tests of endogeneity
Ho: variables are exogenous
```

```
Durbin (score) chi2(1) = 3.2806 (p = 0.0701)
Wu-Hausman F(1,86) = 3.04286 (p = 0.0847)
```

```
. estat firststage
```

```
First-stage regression summary statistics
```

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	F(1,87)	Prob > F
dhincome	0.1713	0.0951	0.0628	5.83372	0.0178

Minimum eigenvalue statistic = 5.83372

Critical Values # of endogenous regressors: 1
Ho: Instruments are weak # of excluded instruments: 1

	5%	10%	20%	30%
2SLS relative bias		(not available)		
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53

**APPENDIX V: HAUSMAN ENDOGENEITY TEST RESULTS – LIFE
EXPECTANCY**

```
. ivregress 2sls life Age Dgender Dmaritals1 edu disthealth BMI Meal (dhincome
> = dins)
```

```
Instrumental variables (2SLS) regression                                Number of obs =      96
                                                                    Wald chi2(8) =      81.58
                                                                    Prob > chi2 =      0.0000
                                                                    R-squared =      0.3640
                                                                    Root MSE =      8.0033
```

life	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
dhincome	-7.877833	6.930323	-1.14	0.256	-21.46102	5.70535
Age	.7316251	.1065722	6.87	0.000	.5227475	.9405027
Dgender	-.4585834	2.256533	-0.20	0.839	-4.881307	3.96414
Dmaritals1	-6.299151	2.81961	-2.23	0.025	-11.82548	-.7728173
edu	.2981283	.3090011	0.96	0.335	-.3075027	.9037593
disthealth	-.0009728	.0007899	-1.23	0.218	-.002521	.0005753
BMI	.1204884	.2113021	0.57	0.569	-.293656	.5346329
Meal	-1.902336	2.35091	-0.81	0.418	-6.510034	2.705362
_cons	24.91476	9.004819	2.77	0.006	7.265637	42.56388

```
Instrumented: dhincome
Instruments: Age Dgender Dmaritals1 edu disthealth BMI Meal dins
```

```
. estat endog
```

```
Tests of endogeneity
Ho: variables are exogenous
```

```
Durbin (score) chi2(1) = 2.3416 (p = 0.1260)
Wu-Hausman F(1,86) = 2.15013 (p = 0.1462)
```

```
. estat firststage
```

```
First-stage regression summary statistics
```

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	F(1,87)	Prob > F
dhincome	0.1713	0.0951	0.0628	5.83372	0.0178

Minimum eigenvalue statistic = 5.83372

Critical Values # of endogenous regressors: 1
Ho: Instruments are weak # of excluded instruments: 1

	5%	10%	20%	30%
2SLS relative bias		(not available)		
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53

CURRICULUM VITAE

Personal Information

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Marital Status: Married
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Educational Background

2007 – 2010 Zanzibar University (ZU) Award: Bachelor of Art and Social Science in Economics.
2002 – 2004 Benbella Secondary School Award: Advance Certificate of Secondary Education (ACSEE).
1996 – 2001 Haile Sellassie Secondary School Award: Certificate of Secondary Education.
1989 – 1995 Mwembeladu Primary School.

Employment Experiences

- 2011 – To Date: Planning Officer in Immigration Department, Zanzibar Head Office.
- 2010 – 2011 Statistical Officer, Regional Immigration Office - Urban West Region
- 2006 – 2007 Immigration Officer – Kigoma Region.

Skills

Proficiency in writing and spoken English and Swahili.

Project write up.

Data Analysis.

Referees

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I, the undersigned hereby certify that to the best of my knowledge and belief, this profile correctly describes myself, experience and qualifications.

Signature

18 November, 2016