HOUSEHOLD SOCIO-ECONOMIC STATUS AND HEALTH DISPARITY OF CHILDREN UNDER FIVE YEARS IN URBAN-RURAL KAGERA REGION

By

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A Dissertation Submitted to the Faculty of Social Science in Partial/Fulfilment of the Requirements for Award of the Degree of Master of Science in Economics (MSC ECO) of Mzumbe University

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CERTIFICATION

We, undersigned, certify that we have read and hereby recommend for acceptance by Mzumbe University, a dissertation entitled **"Household Socio-Economic Status and Health Disparity of Children under Five Years in Urban-Rural Kagera Region"** in partial/fulfillment of the requirements for award of the Degree of Master of Science in Economics (MSc Eco) of Mzumbe University.

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I, **Enock M. Kamala,** declare that this dissertation is my own original work and that it has not and will not be presented to any other institution for the award of the said qualification or any other similar award

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DEDICATION

To my lovely Parents, Mr. Laurent M. Kamala and Mrs. Winifrida I. Kamala.

LIST OF ACRONYMS AND ABBREVIATION

BMI	–	Body Mass Index
EMONC	–	Emergence Obstrics and Newborn Care
FANC	-	Focused Antenatal Care
FP	–	Family Plan
GDP	–	Gross Domestic Product
HAZ	–	Height for Age-Z-score
HSSP	–	Health Sector Strategic Plan
IV	–	Instrumental Variable approach
MDGs	–	Millennium Development Goals
OLS	–	Ordinary Least Square
RMNCAH	–	Reproductive Maternal, Newborns Child & Adolescent Health
SDGs	–	Sustainable Development Goals
SDHI	–	Social Determinants of Health Inequality
SEM	–	Structural Equation Modeling
SES	–	Socioeconomic Status
SRH	–	Self Reported Health
TDHS	–	Tanzania Demographic Health Survey
TDHS	–	Tanzania Demographic Health Survey
THBS	–	Tanzania Household Budget Survey
WAZ	–	Weight-for-Age-Z-score
WHO	–	World Health Organization

ABSTRACT

Health outcomes for children in Tanzania have been improving but child health disparities exist in various forms and at different levels as it stipulated in TDHS report of 2015-16. The study examined the effects of socioeconomic status on rural-urban child health disparities in Kagera region. The study used individual level data from field survey which was conducted in January 2019 to February 2019 in Kagera region, specifically Bukoba Urban and Bukoba rural. To examine rural-urban child health disparity, the study used the sample of 308 households with children aging 24-59 months. Ordinary Least Square (OLS), Instrumental variable approach, Ordered Probit model, and decomposition technique were the methodology employed as to achieve the highlighted objectives. The regression results show that parental education, household income, coughing/flu infection, nutrition intake, drinking boiled water, and gender of a child were the variables that were significant at different levels. The decomposition findings reveal that rural-urban disparity/gap in Height-for-Age Z-scores is -0.68, and total rural-urban gap in predicted probability of having excellent child self reported health is 0.12 points. Rural-urban gap is still a problem in Kagera region and it is prevailing at a large magnitude, as it evidenced from the findings. Household income and parental education were found to be the main contributing variables of the observed disparity. However, the study calls for strengthening Unconditional Cash Transfer programme such as TASAF which should be the major focus of intervention especially in rural residence, aiming at boosting rural households' income.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The linkage between socioeconomic status and health disparities have long been documented and debated during 19th century by some of the researching pioneers such as Friedrich Engels and Salvador (Omotoso & Koch, 2018). For example Friedrich undertook the exploration on the existing connection between high mortality and poor standard of living among working class in England, and Salvador examined emerging health inequalities within populations resulted from social and political factors (Jayasinghe, 2015; Omotoso & Koch, 2018). The terms health inequality, disparity, gap and inequity have been used interchangeably in many studies. They are always referred to differentials associated with socioeconomic status. In broad perspective health inequalities accounts on factors related to natural causes such as biological genes among parents, and inequities in health refers to avoidable causes of health problems (Omotoso & Koch, 2018). Socioeconomic status (SES) is a multidimensional concept of special importance for the several aspects such as growth, development, health outcomes and education of children. Depending on how a particular study defines SES, it can be viewed as good or bad predictor of health outcomes in children (Strohschein, 2005; Vukojevic *et al*., 2017). Lack of economic resources and poverty of parents have been linked to affect all aspects of the child‘s life in terms of health outcomes and education together with their social inclusion (Vukojević *et al*., 2017).

World Health Organisation [WHO] (2018) shows that despite progress over the past two decades on child health improvement in 2017, the deaths of about 6.3 million children and young adolescents was mostly resulted from preventable causes. Half of the highlighted number all deaths under 5 years of age existed in sub-Saharan Africa and the other 30 percent of deaths existed in Southern Asia. It was further observed that 1 child in 13 children died before attained fifth birthday in sub-Saharan Africa.

The estimated number of deaths among children was much lower in developed countries in which the number was 1 child in 185 children. Child health improvement was one of the priorities among the developing countries in which national governments during implementation of the Millennium Development Goals (MDGs) had to present their efforts in all process of achieving the MDGs in 2015. Heaton, Crookston, Pierce and Amoateng (2016) emphasize that MDGs on child health in many Sub-Saharan African nations lagged far behind target but there was a progress in several low-income countries. Persistence of low socioeconomic status among parents has been associated with low GDP in developing countries in which its people suffer from a high rate of poverty which in turn influences the existences of health disparity within and among countries (Heaton *et al.*, 2016; Vukojevic *et al.*, 2017).

Tanzania has continued to experience good macroeconomic progress since the mid 2000s. URT (2013) shows an increase of GDP (Tanzania Mainland) from Tanzanian Shillings 44.7 trillion in 2012 to Tanzanian Shillings 53.17 trillion in 2013, and it was recoded to be 52.09 billion USD in 2017. Poverty incidence on the side of basic needs had declined from 34.4 per cent in 2007 to 28.2 per cent during 2011-2012 and food poverty incidence declined from 11.8 per cent in 2007 to 9.7 per cent during 2011-2012. In spite of relatively observed high growth that is having GDP increase from 1.6 percent in 1992 to 7.1 percent in 2017, poverty reduction among households has been slow and uneven. The population proportion living below the national poverty line decreased from 38.6 percent, as indicated in the 1991–92 Household Budget Survey [HBS] to 33.6 percent according to the HBS (2007). Basic needs poverty declined 28.2 percent in 2011/12 and extreme poverty 9.7 percent. The 9.7 percent of the population that is extremely poor cannot afford to buy basic foodstuffs to meet their minimum nutritional requirements (THBS, 2011/2012), and this has been the cause of the occurrence of malnutrition among children especially stunting problem.

Tanzania Demographic Health Survey [TDHS] (2015) shows that the prevalence of stunting was found decreasing markedly to 40 percent among children aging 18 to 47 months much lower compared to 42 percent of TDHS 2010, and 17 percent of children are severely stunted. 1child in 6 children having 24-35 months is severely stunted. Stunting still varies with regions where, Rukwa (56 percent), Njombe (49 percent) and Ruvuma (44 percent) these are regions having the highest stunting prevalence, Dar es Salaam region is having lowest of 15 percent. Diarrhea is slightly higher in urban areas (14 percent) compared with rural areas (11 percent) in Tanzania. Diarrhea prevalence was high in Kigoma region and Rukwa having about 20 percent each. Tabora was the region having the lowest prevalence of about 5 percent. Difference in anaemia prevalence is also observed among children whose mothers have at least secondary education and those whose mothers have no education (54 per cent versus 66 per cent) and those from the highest and lowest wealth quintiles (50 percent versus 64 percent). Kagera region has been identified has one of the region having high rate of stunting (42 percent) which is above the average. These facts provide a clear understanding on the existence of child health disparity among regions in Tanzania.

Health status is the result of complex causes including socio-demographic factors, environmental, genetic and biomedical factors (Mugo, 2012). Strauss and Thomas (2008) emphasize that health status varies over the life cycle with the implication of intergenerational health effects. Initial health stock at individual level is mostly determined by family background that is parental SES and development level of given society, the effects of these two key factors base on investments done in health and other health enhancing goods by individuals and the government (Ajakaiye & Mwabu, 2009; Mugo 2012). Household SES can affect the prenatal as well as postnatal development of a child. Children coming from lower socioeconomic status families are usually at high risk of preterm and having low birth weight. Child health has been linked to SES indicators such as employment status of parents, parental education, and standard of living together with household income (Siponen, Ahonen, Savolainen & Anttilla, 2011; Meko, Slabber-Stretch, Walsh, Kruger & Nel, 2015; Heaton *et al*., 2016). Economic status has been singled out as a key social

determinant of child health in the millennial development goals, but maternal education and type of residence are also important (Heaton *et al*., 2016)

In the past two decades, strategies like improving health care financing, improving access to healthcare, poverty reduction, and increasing educational level were among the proposed and implemented strategies by developing countries in order to reduce child mortality and improve child health (Mugo, 2012). These interventions are inexpensive to be undertaken despite of being essential interventions for lowering health inequality. Expenditures diverted in health care are associated with lowering disparities in health outcomes among urban and rural residences. However, promoting economic development and poverty reduction are viewed to be the major strategies that affect child health outcomes and reduce disparities among regions. Boyle, Racine, Georgiades and Dana (2006); Lartey, Khanam and Takahashi (2016) emphasize that economic development could contribute to child survival in one major way which is through increasing health expenditure. Chambers and Booth (2012) found that an increase in health expenditure per capita may influence health outcomes, but some research findings are inconsistent with that perception, an example is witnessed in Uganda where health outcomes have improved only a little despite greatest health expenditure, also this is evidenced in Niger where health outcomes remain unchanged in Niger despite doubling in health spending in five years between 2004 and 2009 (Heaton *et al*., 2016).

UNICEF report (2018) show that the health sector in Tanzania was allocated with Tanzanian Shillings 2.22 trillion in Fiscal Year 2017-18 and it represents a 34 percent nominal increase on 2016-17 or a 28 per cent increase once adjusting for inflation. The health budget accounts for 7 per cent of the national budget and 1.8 per cent of gross domestic product (GDP). With this huge investment, health outcomes for children in Tanzania have been improving but health disparities exist in various forms and at different levels.

The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not just the absence of disease and infirmity. This definition provides a clear picture that child health is a

multidimensional phenomena. It is not easy to have one indicator of a child health that captures the multidimensional nature of child health from a given survey (Wagstaff *et al*., 2009; Khaoya, 2015; Omotoso & Koch, 2018). It is believed that when respondents answer self reported health question, they consider their physical, mental and social well-being before declaring their health status.

1.2 Problem statement

Socioeconomic factors are regarded as important determinants of health and are highly responsible for the existences of health disparities within and among countries (Heaton *et al*., 2016; Liu, Rizzo & Fang, 2016; Chattjee *et al*., 2016; Omotoso & Koch, 2018).

Kagera region was recoded to have highest rate of stunting (among children under five years) having 42 percent above the national rate of 34 percent as observed in TDHS (2015), also much bigger than the global stunting average of 26 percent as shown by WHO (2018). Residence variation in Tanzania also persists where the rural areas are having high rate of 38.1 percent of stunting compared to urban areas having 25 percent. TDHS (2015) report on childhood illness show that 18 percent of children under age 5 were reported to have fever in the 2 weeks before the survey. Urban children under six years were reported to have fever (18.1 percent) compared to rural children having 17 percent.

The studies done in Tanzania have used anthropometric indicators (Body Mass Index, Height for Age, Weight for Age) to capture child health status (Mukong, 2015; Mukong & Burns, 2017), of which these indicators only address physical health and not social well-being of a child as WHO describes child health (Khaoya, 2015). From this description it can be depicted firstly, the use of few indicators in assessing child health outcomes, may give a narrow picture of child health disparities and thus underestimating overall health gap which exist particularly in Tanzania context which is experiencing several multiple health challenges. Secondly, one-time assessment of health disparities using a single outcome can downplay the effects of poverty intervention related program such cash transfer programme (TASAF) which

the Tanzanian government has been undertaking upon to boost the income of poor households.

This study therefore uses HAZ and SRH as the measures of child health, rather than relying on intuitive assumptions or evidence from other countries with different cultural and demographic settings. However, this study sought out to examine the effects of socioeconomic status on the rural-urban gap in child health, in the context of Tanzania specifically in Kagera region.

1.3 Objectives of the study

1.3.1 General Objective

To examine the effects of socioeconomic status on rural-urban child health disparities in Kagera region.

1.3.2 Specific objectives

Specifically the study sought;

i. To assess the effect of socioeconomic status on child nutritional status
ii. To assess the effect of socioeconomic status on child self-reported health
iii. To examine the relationship between household socioeconomic indicators, pathways/channels and child health
iv. To estimate the existing child health gap/disparity between rural and urban residences

1.3.3 Research Questions

i. What is the effect of socioeconomic status on child nutrition status?
ii. What is the effect of socioeconomic status on self-reported health among children?
iii. Is there any relationship between household socioeconomic indicators, pathways/channels and child health?
iv. What is the existing child health gap between rural and urban residences?

1.4 Significance of the study

Children physical and cognitive development is well defined by the first 5 years of life and these contribute greatly on the potential attainments in adult life. This study is significant in the following ways; first, high rates of stunting among children and the regional disparities in child health have been decreasing at slower rate in Tanzania, it therefore very important to understand SES related factors which influence stunting. Being aware on this will create a benchmark on designing or targeting interventions that enable greater equity and improved child health outcomes. Second, a study widens knowledge on the persistence of health gaps in Tanzania by revealing how social and economic changes within our communities are intertwined with individual attributes to generate observed child health gaps. Third, it sheds light on the mixed results from previous studies especially on the effect of socioeconomic status to self-reported health among children.

1.5 Scope of the Study

The study was concerned with rural-urban child health disparity in Kagera region by involving children below five years (24-59 months). Height for Age Z-scores and self reported health were the measures used to capture child health.

1.6 Organization of the Study

Chapter one introduces the topic, problem statement and study objectives. Chapter two provides reviews on relevant theoretical and empirical literature on socioeconomic status and rural-urban child health disparity, chapter three presents the methodology and estimation models adopted for the analysis. Chapter four is concerned with presentation of the study findings and interpretation; the fifth chapter provides discussions of the findings and lastly chapter six provide a summary, conclusion and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides the theoretical literature on socioeconomic status and health disparities and the related empirical studies. The selected theoretical literatures are fundamental cause theory and Grossman model**.**

2.2 Description of the key concepts

2.2.1 Self- reported health (SRH)

This is also called Self- rated health, perceived health, or Self-assessed health. These terminologies all provide a description on a single question regarding on how a person reports or rates her/his health status. The responses provided are mainly based on four outcomes which are qualitative, and these responses are excellent, very good, good, fair, or poor (Au & Johnston ,2013; Khaoya, 2015). It is believed that when respondents answer SRH question, they consider their physical, mental and social well-being before declaring their health status. This study therefore uses Self-reported health to reflect rated health of children.

2.2.2 Health disparity/Health gap

Health disparity/health gap is also referred to health inequities. WHO (2017) defines health inequities as systematic differences in the health status or distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work and age. These differences are regarded to be unfair and could be reduced through using government policies. Health disparity or health gap have been used interchangeably in this study referring on the existing differences in child health among the studied residences.

2.2.3 Health Sector Strategic Plan (HSSP) IV I n Tanzania (2015-2020)

The overall objective of HSSP IV aim at reaching all households with essential health and social welfare services and to meet as much as possible, the expectations of the population, this is by adhering to objective quality standards, and applying

relevant interventions through a proper selection of efficient mechanisms which can ensure maximum service delivery. This objective is being realized through five strategic objectives and one of its strategy addresses socioeconomic factors. The strategic objective 5 of HSSP IV targets on addressing the social influential factors of health, the health and social welfare sector through collaboration with other sectors, and advocating for the inclusion of health promoting and health protecting measures in other sectors' policies and strategies (HSSP IV, 2015).

2.2.4 One Plan II in Tanzania (2016-2020)

One Plan II takes into account the emphasis enclosed within Sustainable Development Goals (SDGs) and other international strategies. International strategies explain the importance of the availability of health related resources together with pillars of the health system which would obviously influence provision of quality reproductive health services. Also, national policies and strategies which try to enhance a conducive environment for proper pregnancy outcome are translated under this One Plan II strategy such as service provision, along the continuum of care, from pre-pregnancy to postpartum period; using antenatal and Emergency Obstetrics and Newborn Care (EMONC) interventions and services, and improved newborn and child health, through sustained gains of Millennium Development Goal (MDG) milestones.

The major goal of this strategy is to improve reproductive, maternal, newborn, child and adolescent health (RMNCAH) in Tanzania in line with the National Development Vision 2025. One strategy under its goal considers child health improvement. Thus, it aims at strengthening reproductive maternal, newborn, child, and adolescent health Strengthen maternal health and newborn health services, including focused antenatal care (FANC), emergency obstetrics and newborn care [EMONC], family planning (FP); and postnatal and newborn care (One Plan II, 2016)

2.3 Overview of Child Health in Tanzania

2.3.1 Trends in child health status in Tanzania

There are two commonly used indicators of child health. First child survival or child mortality rate, and the weakness of this measure is that it does not provide description on the health status of children currently alive (Mukong, 2015). The second one is child nutrition status which accounts on anthropometric indicators, these include birth weight, height-for-age Z-score (stunted), weight for age Z-score (underweight), weight-for height Z-score (wasting), TDHS 2015-16 show that one-third of children below age of 5 are estimated to be stunted (that is short for their age); 5 per cent are found wasted (that is thin for their height) and 14 per cent are regarded to have underweight (thin for their age).

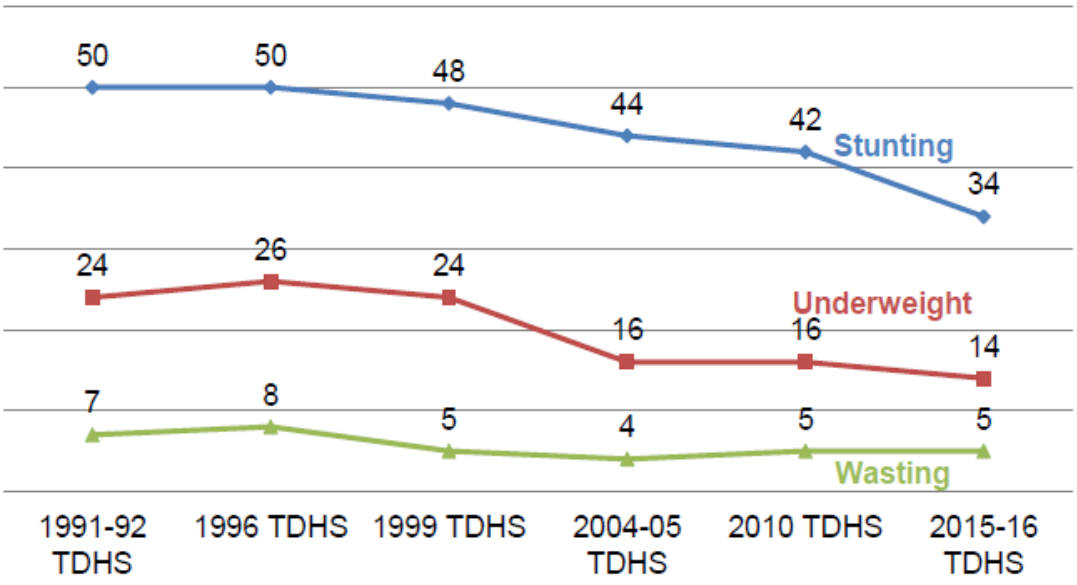

Figure 2.1 Children below age of 5 recoded as malnourished (Percentage)

Source: (TDHS, 2015)

The trends above in figure 2.1 obtained from TDHS (2015) show that stunting is observed to rise with a child age, and is recoded at level of 40 percent or even more to children aging 18-47 months. One child in six children aging 24-35 months is found to be severely stunted. Children who are born being very small 51 percent or small 46 percent at birth had the probability of having stunting than those having average size or large size.

2.3.2 Infant and child mortality in Tanzania

The Government of Tanzania through undertaking and passing health related national policies, and by signing on global policies has helped in improving access to basic health services and medicines, which in turn has made reduction of child mortality to be possible. TDHS report (2015) show that neonatal, infant, and under-5 years mortality are direct estimated to have the risk of dying within 1 month, 1 year, and 5 years after birth, respectively.

Figure 2.2 below shows trends in neonatal, post neonatal, infant, child, and under-5 mortality rates for the 5 years before the 2015-16 TDHS surveys. The remarkable decline in mortality rates since 1999 is revealed.

2.3.2.1 Early childhood mortality trends

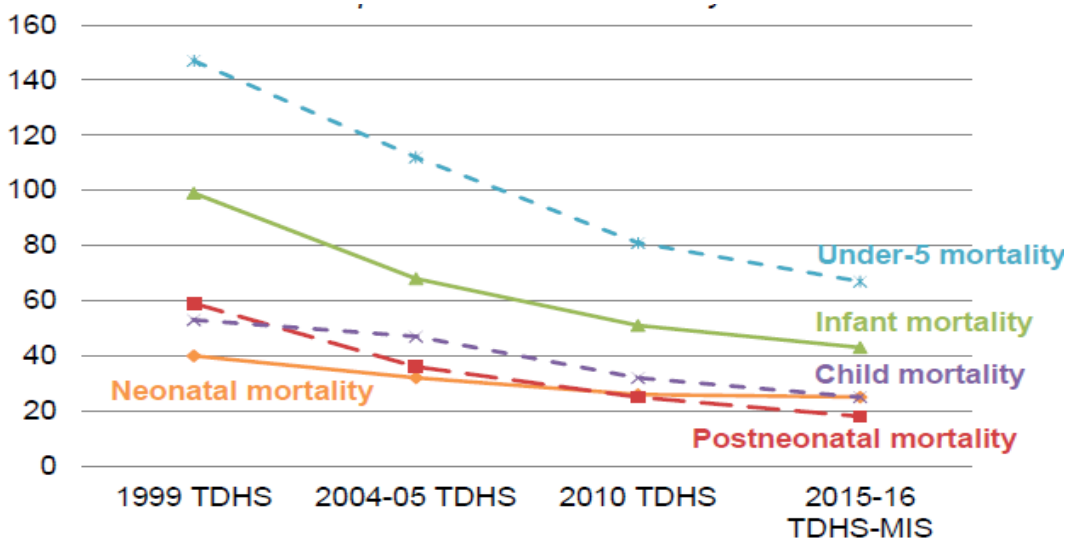

Figure 2.2 Deaths per 1,000 live births in the 5-year period before the survey

Source: (TDHS, 2015)

Childhood mortality rate is expected to be lower among children living in urban areas than children residing in rural areas, given that urban areas usually are consisted of having better health services, education, and living conditions than rural areas. Tanzania has a fairly strong health system which starts at the district and local level, and then to secondary and tertiary levels where health care is offered, and moves into the central level, which includes issues related to policy making process, monitoring and evaluation (Path, 2014). Tanzania has achieved strong a capacity for vaccine coverage throughout the country, this range between 80 and 90 percent coverage with diphtheria, and tetanus (DPT3), and polio vaccines. Despite improvements in child survival in Tanzania, more progress is still needed. One child in 12 children is still dying before the 5 age. The impact is greater among the poorest Tanzanian households, such that 10 percent of children die before they reach their fifth birthday. Pneumonia and diarrhea, which are both preventable illnesses among children, are the second and third leading causes of child death in Tanzania, that account for 21 and 17 per cent of child deaths, respectively (TDHS, 2015).

2.4 Theoretical literature

Several theories have been put forward in explaining the existence of health inequalities from the social contexts. Recent exploration of the theories on the influence of social determinants on health and health inequality involves the studies done by Lieberson (1985) on theory of fundamental causes which was developed by Link and Phelan (1995), and further extended by Lutfey and Freese (2005), Link and Phelan (2010) and it has been used in several studies such as Heaton *et al.* (2016), and Omotoso and Koch (2018). The term social determinant of health inequalities has been used in recent theories to refer on social norms, economic contexts, and social structures which have an impact on health outcomes. Two theories have been picked out in this study which are explained below.

2.4.1 Theory of Fundamental Causes

The idea behind the theory emerged in 1995 within the Journal of Health and Social Behavior. Fundamental cause theory tries to point out on the reason why the relationship between socioeconomic status (SES) and differentials in health has been

existing over time, and particularly when issues related to health challenges which were previously regarded as threat on morbidity and mortality among poor households have been resolved. Link and Phelan (1995); Link and Phelan (2010) show that a fundamental social cause of health inequalities consist of four essential features. These features are; firstly, SES influences several disease occurrences; secondly, SES is considered to generate several risk features responsible for disease and death; thirdly, there is relationship between SES and health outcomes due to the existence of resources differentials; and lastly, new features which affect the relationship between SES and health outcomes are still emerging.

Fundamental causes affect health outcomes regardless even if when the profile of risk and protective factors changes radically. If the problem is a contagious illness such as cholera, for example, households with more resources are more likely to avoid areas that consist such disease occurrence, and highly resourced communities such as urban residences are more likely to avoid entry of infected persons (Link & Phelan, 2010). Availability of resources in a given residence can be diverted into a multiple uses, and in different circumstances that is being regarded as flexibility of resources. It is therefore a resourceful availability to be used flexibly by households and the groups within a given community that place their endowed resources in terms of education, power, money, and social positions they are having in the community at the center of fundamental cause theory. Resource use flexibility suggests why SES disparities try to rebirth again as the time passes (Heaton *et al*., 2016; Omotoso & Koch, 2018).

Fundamental cause theory regards flexibility of resources in a given residence to be the central argument of the theory, and it operates at the individual and contextual levels. For example, by considering a person being endowed with a plenty of resources, obvious this person can afford to live in a high SES community where neighbors are also of high status and the area lived in is free from crimes, violence and pollution of all kinds, and there exist best healthcare facilities and other basic facilities are also located nearby. However, when a person residing in a resourceful residence has utilized SES-related resources and then health-enhancing outcomes

appear along as a package. The same applies to an individual endowed with educational credits who is able to secure a good paying job thus being able to accumulate excellent health package simply because health inputs can be bought with the available income, and less likely to be exposed to unfriendly environment with the possibility of diseases occurrences (Cockerham, 2005; Link & Phelan, 2010; Heaton *et al*., 2016). Increasingly, research findings report that variation of socioeconomic circumstances such as having no jobs, poor working environments, poor housing conditions, limited supply of safe water, undeveloped farming policies, undeveloped health related systems from national level to ward level, and persistence of corruption among ruling politicians, access to education and availability of transport are indicators that influence health outcomes and health differentials among residences.

2.4.2 The Grossman model

The model is embodied in the human capital theory which shows how individuals increase productivity through investing in human capital such as education. Good health is a commodity which is produced by the individual as it argued by Grossman (1972) in his seminal work. Good health as commodity is regarded as part of individual human capital, and as such it defines the total amount of time that an individual can be able to influence production in market and non-market sectors.

This however influences an individual to demand health capital up to the point where the costs of one additional unit of health capital is equal to the total of additional time value for production and being healthy utility value created be an added unit of good health. Let the individual's utility function be:

$$U = U(H_t, Z_t), \quad (1)$$

where H_t is the stock of health in period t, and Z_t is consumption of other goods. The length of life is fixed here and it is an endogenous variable. Despite decrease in individual's stock of life during a lifetime still the person can invest in health, that is;

$$\frac{\delta H_t}{\partial t} = I_t - \delta_t H_t \quad (2)$$

Where I_t is a gross investment in health and δ_t is the rate of depreciation rate of health during *t* period. I_t is a gross investment in health produced by an individual, Z_t is the other commodities produced, therefore given a set of production functions below;

$$I_t = I_t(M_t, h_{t,H}; E_t) \quad (3)$$

and

$$Z_t = Z_t(X_t, h_{t,Z}; E_t), \quad (4)$$

where M_t is healthcare, X_t is the market goods, $h_{t,H}$ and are time inputs, and E_t is human capital stock. Human capital changes, leads to production efficiency of the in the non-market goods within an economy.

From equations 3 & 4, by assuming that the prices of given health inputs do not change and parents allocate large part of their income (investment decision) in I, then more health inputs (healthcare access among children, buying nutrient food) will be invested to children and thereby achieving better child health. A parent as a producer of a child health seeks to allocate health related inputs as to build a strong child health stock, in which in this study three main inputs are considered which are nutrient food intake, healthcare access and access to drinking boiled water among children. The production of child health is further specified in the next chapter subsection 3.8.1.

2.5 Empirical literature review

Parental bargaining and rural-urban child health differential in Tanzania was a study done by Mukong and Burns (2017), using a cross sectional survey data from TDHS 2010. Using a probit model and the OLS, the effect of parental bargaining on child nutrition was estimated. The results obtained reveal that domestic violence among couples increases the probability of child to be stunted whereas cooperation in decision-making between couples in the family and female freedom on utilizing household resources lowers the possibility of child to be stunted. The significance of parental bargaining effects is mainly observed in rural residence than in urban communities. Disparities in parental bargaining among couples were found to

influence for 4 per cent of the rural-urban disparity in child nutritional status. The study recommends on enhancement of cooperation among couples or female involvement in household decision making issues, and also limiting domestic violence in rural residences can help lower the level of disparities in child nutrition status. Despite the inclusion of two indicators (HAZ and child survival) measuring child health in this study, child survival has been inefficient to address the current child health status.

Kia, Rezapour, Khosravi and Abarghouel (2017) assessed the socioeconomic inequality in malnutrition in under five years children in Iran. The data of 8443 under five years children was sorted from the Iran Multiple Indicator Demographic and Health Survey, and the wealth index was used as an indicator for SES. Concentration index was used to estimate socioeconomic inequality in nutritional status indicators that is stunting, underweight, and wasting. Prevalence of stunting was more than underweight and wasting. The results obtained from the concentration index show that stunting and underweight indicators to be statistically significant among children in the lower SES group. The wasting index was found to have weak relationship with SES indicators, and its CI value was insignificant. The study further identified that it could be misleading to give assessment of the average levels of stunting at the national level without considering its distribution among socioeconomic groups in the country. This study failed to involve the intervening variables which probably specify the indirect effect of the involved variables in the study.

Huda, Hayes, Arifeen and Dibley (2017) examined the extent of socioeconomic related inequalities in childhood stunting and identified the key social determinants that are likely to explain the observed inequalities in Bangladesh. The study based on children below five years of age using two sets of data from Demographic and Health Surveys of which conducted in 2004 and 2014. Results obtained from using CI of stunting indicated that stunting was more concentrated among the poor than among rich ones and this was clearly observed from the negative concentration curve. Inequalities in stunting were found to be increasing between 2004 and 2014. Explanatory variables such as parental education household economic status, health

seeking behavior among mothers, sanitation behaviour, and maternal low heights were the major contributors to the differentials in stunting prevalence in Bangladesh. Health policy makers were recommended to strengthen collaboration across sectors and develop strategies for effective intersectoral actions to adequately advocate the social determinants of equity in Bangladesh and reduce inequalities in stunting and other identified health outcomes. The study failed to accommodate the problem of employing several indicators of child health.

Rabbani, Khan, Yusuf and Adams (2016) used six rounds of Bangladesh DHS data. Using recognized measures of absolute and relative inequality, quantification of trends, and decomposition of changes in the CI was done to identify features that best explain observed changes. The study identified that, despite improvements done in nutritional status over the last years, socio-economic inequalities were found to be evident, and even worsened to some measures. Decomposition analysis results confirmed that household economic status and factors such as mothers schooling and short stature are major contributors to observe socio-economic inequalities in child under nutrition and their changes is observed over time. The study recommended on strengthening nutrition programming energies by focusing specifically on the poorest group. This study only focused on nutritional indicators of child health and ignored other indicators.

A cross sectional study on socio determinants of inequalities in under nutrition among children under 5 years was examined in Gumla District in Ghana, it was the study which included 1070 children as the sample size. 54.3 percent of studied children had underweight, and variation among child sex was insignificant. Multivariate analysis results revealed that poor economic condition was the main and important explanatory variable that influenced under nutrition. It was further found that 70 per cent of a child from the poorest wealth quintile was more likely to be underweight, compared to the least poor group. Further findings from community separated data showed existence of disparities within the tribal community, and poorer nutrition status was observed to children whom their communities had lower wealth ranking. Educational level among mothers did not show significant variation

among the studied communities (Chattjee *et al*., 2016). This study is in line with the study done by Liu *et al*. (2016) on rural-urban disparities in child nutrition related health outcomes in china. The study used data from the China Health and Nutrition Survey 1993–2009 with a sample of 9616 children under the age of 18. The study estimated height-for-age z-score (HAZ) and weight-for-age z-score (WAZ) for children under age of 18 years. The results reveal children HAZ and WAZ was high with urban hukou compared to children with rural hukou. The included child health measures were not able to reveal the social well being of children.

Amirian *et al.* (2014) measured household socioeconomic status using an asset index and defined 16 health related outcomes. The concentration index was used to examine inequality in the distribution of these health outcomes by socioeconomic status. The effect of inequity on health outcomes was estimated through using measuring SES using wealth index, and CI indicated inequality of health outcome using. Inequality was observed for all outcomes of interest, and the prevalence of low birth weight, underweight, stunting, wasting, children with disability, was approximately more common among the poor. The health inequality in subgroups was estimated to affect poor group because of health risk related to infant mortality and morbidity rates, in which some causes of health risk were preventable cases. This study only focused on nutritional indicators of child health and ignored other indicators which are able to explore on social well being of a child.

Liu, Fang and Zhao (2013) using the China Health and Nutrition Survey data from 1989 to 2006, studied child health disparities among urban and rural residences. The study examined the extent of nutritional disparities between urban and rural children as well as how such disparities have been changing in the period 1989–2006. The obtained results showed that average of HAZ and WAZ was higher among urban children than rural children. Urban children were found to be 40 per cent less likely to be stunted during the period 1989–2006. Child health gap between the two residences was found to be significantly declining from 1989 to 2006. Decomposition results reveal that explanatory variables such as health insurance, parental socioeconomic indicators, demographic characteristics, and health related

behaviors contributed for the half of the explained disparity in child health outcomes. This study only focused on nutritional indicators of child health and ignored other indicators of child health.

Makoka (2013) analyzed maternal education impact on child health specifically nutritional status among three African countries using data of different years from the Demographic and Health Surveys (DHS) from Malawi, Tanzania and Zimbabwe. Pearson Chi-square test of independence together with bivariate analyses were employed as the analytical tools to test the relationship between education among mothers and three child nutritional status indicators. A logistic model regression was employed in order to assess the determinants of the nutritional status among children and to estimate the existing relationship between maternal education and child nutrition. Three measures of child nutritional status were found to be significantly decreasing with increased levels of mother's education in all three countries. The analysis further show that, education levels among mothers reduced the odds of the three measures of child nutrition after employing control approach in all three countries. This study only focused on nutritional indicators of child health and ignored other indicators, and child health gap was not estimated.

Mugo (2012) using Kenya Integrated Household Budget Survey 2005-2006 survey data studied parental socioeconomic status impact on child health outcomes in Kenya, specifically by concentrating on maternal labor force participation. 2SLS IV approach and the control function approach were used as to account for endogeneity problem and heteroskadasticity in estimating the relationship between child health outcomes and parental SES in Kenya. Maternal labor force participation had an insignificant effect on child health outcomes (stunting and wasting) despite positive relationship. The findings on maternal education were contrary to theoretical expectation. The findings further reveal that younger children are at risk of poor health, and study the recommended that nutritional programmes should target younger children and especially those living in rural areas. The study further recommends on the policy that support women empowerment in Kenya. This study

only focused on nutritional indicators of child health and ignored other indicators, and child health gap was not estimated.

Wu (2011) employed a panel data to examine the existing linkage between health of children and parental socioeconomic status in China. The results show the existence of weak relationship between children SRH status and parental income. Parental occupational status had little contribution to the observed disparities in child health status. Furthermore child characteristics such as age, sex were also found to significantly correlate with child health outcomes. The nutritional status was observed to deteriorate with age at a decreasing rate, alarming a possible age-related growth failure among Chinese children. Recommendation of the study emphasized on insurance coverage in the rural areas may improve rural children's health status, since health insurance appears to influence better health outcomes of rural children. This study failed to account for rural-urban gap in child health.

Siponen, Ahonen, Savolainen and Anttilla (2011) examined child health outcomes and socio-economic status among parents in Finland. A survey among Finnish children having 12 years of age was conducted in 2007. Parents were required to rate their child health basing on likert scale ratings. The other measured outcome apart from SRH measures were psychosomatic symptoms, and long-term diseases. The prevalence of psychosomatic symptoms and long-term diseases were both 11 percent. The probability for poor health status was found to be lower among children aged 3 and 11 years. Socioeconomic factors were found to have no effect on child health. This study failed to account for rural-urban gap in child health.

2.6 Conceptual framework

The frameworks below provide the relationships between household SES as an independent variable and child health outcomes, child health disparity. In the first conceptual framework literature has identified several sets of explanatory variables used to explain variations in health outcomes. These include socioeconomic status, and health related behaviour and health care access have been regarded has the intervening variables. Socioeconomic status factors include per capita household income, educational attainment and work status. Health care access is measured by

clinic visit, and also health related behaviour is concerned with nutrition intake and drinking boiled water.

The dependent variables are child health outcomes and child health disparity which will be measured by using height-for-age and Self-Reported Health. SES factors have been reportedly to influence child health disparity indirectly; household SES affects the health behaviour and health care (which are regarded as intervening variables in the framework) which in turn contribute to child health disparity among rural and urban areas. The linkage between independent variables and dependent variables are demonstrated in the below framework.

The first conceptual framework in figure 2.3 shows the relationship existing between SES indicators, intervening variables (health care access and health related behaviour) and child health outcomes. In addressing the first two specific objectives, intervening variables are regressed as the explanatory variables together with SES indicators. Then after the existing relationship between SES indicators, intervening variables and child health outcomes is confirmed through using SEM technique in which this tries to address third specific objective. The use of SEM is because the technique is considered to be strongly capable of hypothesizing any type of relations and interactions among the involved research variables in a single framework, and it has ability of estimating direct and indirect effects (Maiga, 2015).

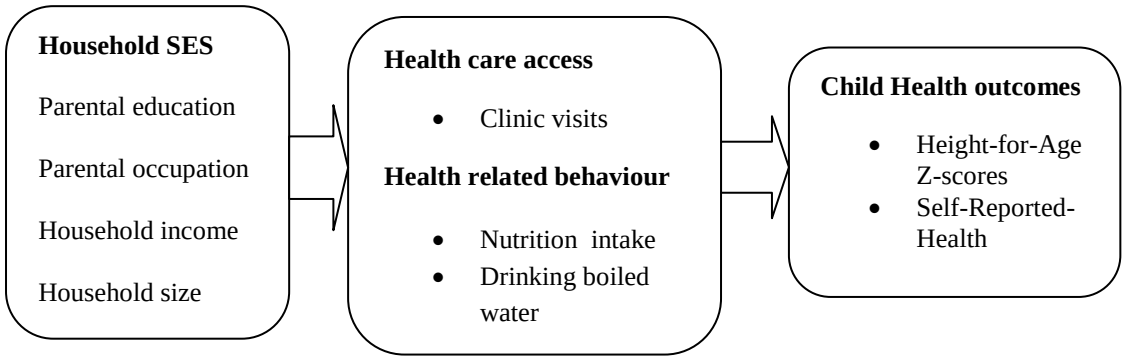

Figure 2.3 Conceptual Framework showing the relationship between Health Outcomes and Socioeconomic Status.

The second conceptual framework in figure 2.4 addresses the fourth specific objective; it thus presents the existing relationship between SES indicators, intervening variables and health gap. Intervening variables are regressed as the explanatory variables together with SES indicators; this is by aiming at identifying the effect of each included variable on decomposed health gap.

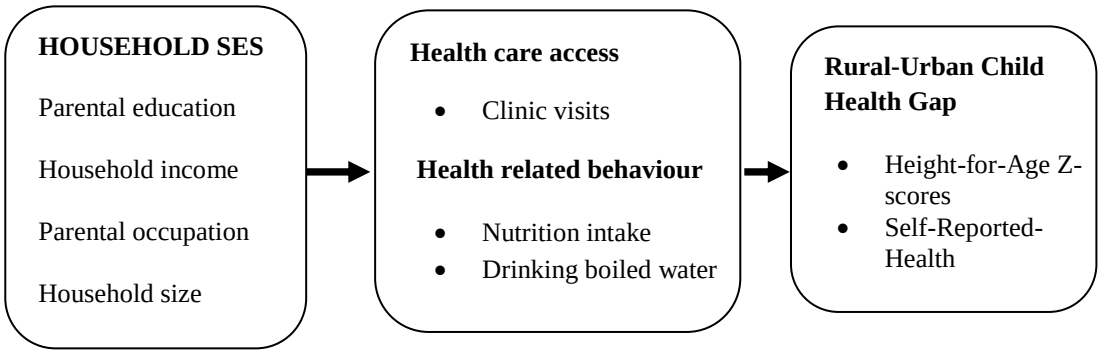

Figure 2.4 Conceptual Framework showing the relationship between Child Health Disparity and Socioeconomic Status

2.6.1 Linkage between theoretical literature, conceptual framework and the empirical studies reviewed

The theoretical literature part of this study reviewed theory of fundamental cause and Grossman demand for health basing on the theory of human capital. Both theories provide a strong link between SES and health disparity. Grossman model on its explanation on health capital and demand for health care, parents directly or indirectly engage in child health production using market and non-market or behavioural inputs. Socioeconomic status variation among parents creates a different usage of market and non-market or behavioural inputs, which in turn contribute to the existence of disparities/gaps on health among children. Fundamental cause theory stress on existence of disparities at the individual and social contexts levels. For example, by considering a person being endowed with a plenty of resources, obvious this person can afford to live in a high SES community where neighbors are also of high status and the area lived in is free from crimes, violence and pollution of all kinds, and there exist best healthcare facilities and other basic facilities are also located nearby.

Existing literature such as Liu *et al.* (2013) and Rezapour *et al.* (2017) also provides good theoretical insights into causal mechanisms accounting for links between various SES dimensions and health disparities. Depending on the measure of child health used, studies have revealed positive and significant relation while others found no evidence of significant relationship. For example, education is believed to promote good health not only by generating economic resources such as income and employment but also by providing healthy behaviors among households.

Income has been also shown to promote health by affecting nutrition, housing quality, exposure to environmental hazards, stress, and access to adequate health (Wu, 2011; Liu *et al.*, 2013; Rezapour *et al.*, 2017). Vulnerability of low-income families are resulted from being unable to afford adequate physical and mental health care (Mugo, 2012; Wu, 2011), limited access to healthy food and quality water. Weak correlation between a child self-reported health and household income is observed, and this different from studies done developed countries' setting (Siponen *et al*., 2011). Parental occupation status appears to be of little importance from revised few studies in contributing to observed disparities (Wu, 2011).

Decomposition results examined from several literatures suggest that demographic characteristics, parental socioeconomic status, and health behaviors account mostly for the observed differences in health outcomes. Urban children have been found to have higher height-for-age *z*-scores than rural children, that is urban children are approximately less likely to be stunted (Liu *et al*., 2013; Rabbani *et al*., 2016).

2.7 Research Gap

Based on the reviewed literature, there is a need for undertaking more exploration on the existing rural-urban disparity specifically by involving more measures of child health as it happens that studies done in Tanzania have only focused on nutritional indicators to assess rural-urban gap. One-time assessment of health disparities (health gap) using a few indictors does not go in line with WHO child health description.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology used to achieve the study objectives. Thus, this chapter provides the description on study area, research design, and type of data and methods of data collection, the targeted population, sample techniques, data analysis and econometric diagnostic test strategies.

3.2 Study area

Kagera region is located in the northwestern corner of Tanzania on the western shore of Lake Victoria, and is one of Tanzania's 31 administrative regions. According to the 2012 national census, the region had a total number of households 521 028, in which among this number the urban residence consisted of 55 433 households and rural residence consisted of 465 390 households. The region consists of eight districts which are Biharamulo, Bukoba rural, Bukoba Urban, Karagwe, Kyerwa, Missenyi, Muleba and Ngara**.** TDHS 2015/2016 show that Kagera region has made progress on child health, for example on vaccination among children was recoded to be 88 percent more than the national average coverage of (75 percent), but it has been identified has one of the region having high rate of stunting (42 percent) which is above the national average of (34 percent), also much bigger than the global stunting average of (26 percent) as indicated by WHO (2018). However, these facts were considered as the motivation behind on carrying out the study in Kagera region.

3.3 Research Design

The study examined the effects of socioeconomic status on rural-urban child health disparities in Kagera region using a cross-sectional design which was carried out in the selected districts. The selection on the use of cross sectional research design was because of its significant on permitting one researching to capture several outcomes in one time. Also the use of this kind of design was to ensure easy access of SRH information of children which requires a great attention during measurement, and

child SRH information has been not always included in the existing child health related datasets.

3.4 Study population and Sample population

3.4.1 Study population

Study population is regarded as the whole number of people or items that are of interest in drawing conclusion. This study involved children less than five years of age and their respective parent or parents from two districts, which are Bukoba Urban and Bukoba Rural.

3.4.2 Sample population

Sample population is the proportion of the study population that is actually selected to represent the whole population for generalization and analysis of the topic under study. In the context of this study the sample population was the number of households having children under five years in the region.

3.4.3 Sample size and sampling technique

The study used households having children below five years specifically targeted children aging 2 to 5 years, because children at ages between 2 and 5 are often having physical development, such that during these years, children change from clumsy toddlers into lively explorers of their world, however, a family to be considered for the study had to be living in the same compound, sharing food that is cooked by the same pot and it should therefore contain at least one child less than five years. According to Tanzanian census 2012 Kagera region consists of 521 028 total households. The study assumed at least of one person within this population was obtained from a single household. This had be to be assumed so as to generate the sufficient number of households which would provide the potential information needed for study accomplishment and avoid biasness in allocating the households to be studied in each residence. The population is too large to be studied at once and thus it required adopting sample size formula provided by Yamane (1967) which is given by;

$$n = N/ (1+N (e)^2)$$

n= corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 based on the research condition

By substituting the total number of households gives;

$n = 521028/1+521028\times (0.05)^2$

$n = 399$

Therefore the sample size for the study was 399 households

The randomly selected villages/streets and sub villages/streets in the studied residences were Rwamishenye and Kashai streets in Bukoba urban, and Ibossa, Katembe, Burugo and Bishaka were the villages studied in bukoba rural.

3.5 Type of data and Data collection methods

The study used both secondary and primary data. For primary data, the collection of data was done through structured questionnaires for household survey.

3.5.1 Questionnaire structure

The questionnaires were divided into three main parts. The first includes general information of the study area and household members. The second part covers demographic information on the respondent and the child height, including age. The third part involves socioeconomic information, fourth part is related to self reported health and the last part of questionnaire is about health characteristics related to intervening variables.

3.5.2 Questionnaire Distribution

The questionnaires were distributed basing on the population number in a given residence. Tanzania census of 2012 shows that Bukoba urban district consists total population of 128 796 and Bukoba rural consists of 289 697 total populations, this gives the total of 418 494 people in both districts. Basing on the identified number of households to be studied which are 399 households, then 123 questionnaires was distributed to urban residence which is about 30 percent of total households (399) and rural residence was distributed with 277 questionnaires which accounts for about 69 percent of total households. The exact number of questionnaires to be distributed

in each residence was computed through dividing the population of each residence area to total population multiplied by 399 households, and the obtained number was considered as the households to be studied in each residence.

3.6 Variable measurement and description

Table 3.1 Variable description

Name of the variable	Variable definition	Measurement	Expected relationship
Dependent Variables			
Height-for-age Z-score	This is the number of standard deviations from the median height of a reference population.	Z-score	
Self-reported health status	Child self-reported health status involves the answer to the question, Right now, how would you describe your health compared to that of other people your age? The possible answers are: excellent (1); good (2); fair (3); and poor (4).	Dummy	
Independent variables			
Level of education	Dummy variables are used,1 for uneducated, 2 for primary education, 3 for secondary education, 4 for college/university	Dummy	+/-
Parental Occupation group	Dummy if a parent is a farmer. 1 if a parent is farmer, o for non-farmer occupation	Dummy	+/-
Household size	Number of people residing in a given family.	Continuous	-
Household income monthly	Monthly income of parents with the under five children measured by their monthly expenditure.	Tshs	+
Access to healthcare	1 if a child visited clinic regularly, 2 for rarely clinic visit, 3 if a child does not visit clinic,	Dummy	+
Nutrition intake	1 if a child was fed the nutritious food in the last two weeks, 2 if rarely fed nutritious food, 3 if not fed nutritious food regularly	Dummy	+
Boiled drinking water	1 if parents boil drinking water, 0 otherwise	Dummy	+

Source: Author's construction from reviewed literature

3.7 Data Analysis

The data was analyzed using descriptive statistics and regression analysis. First, descriptive statistics shows the relationship between the computed variables. Second, regression analysis was used to analyze the data according to the objective of the study. The first objective sought to assess the effects of socioeconomic status on nutritional status using height-for-age Z-scores as an outcome; this was achieved by estimating probit and Ordinary Least Squares (OLS).

The second objective intended to assess the effects of socioeconomic status on self-reported health among children. The ordered probit model was employed and the interpretations were done in marginal effects. Third objective was to examine the existing relationship between explanatory variables and intervening variables through affecting child health outcome, SEM technique was employed. The fourth objective sought to estimate rural-urban gap among younger children using decomposition analysis. To understand the prevailing rural-urban differential in child health, the study decomposed the observed child health gap by using the detailed Oaxaca and Blinder decomposition, and Fairlie decomposition technique.

3.8 Anthropometric measurement

Nutritional status of children was measured by using Height-for-age-Z scores: child health outcomes using height-for-age Z-scores. It is defined as $Z\ score = \frac{T_i - T_{median}}{\sigma_T}$ where T_i is the height of child; T_{median} is the median height of the reference population of the same age and gender while σ_T is the standard deviation from the media of the reference population. This variable is used as one of the dependent variable in the child health outcomes equation.

In order examine the low height-for-age (stunting) stunted growth was measured. WHO (2014) shows that a child is said to be stunted or suffer from chronic malnutrition if his/her height-for -age Z-scores falls below -*2* standard deviation from the median of the reference population. It is defined by the study as 1 and 0 otherwise. The use stunting and HAZ in estimating the same child health outcome

was to assess the comparability of the two indicators, and also ensuring results obtained after estimation are not driven by model used in each indicator.

3.9 Econometric Model Estimation and Specification

3.9.1 Ordinary Least Squares (OLS)

Child nutritional status was measured using height-for-age Z-scores which is a continuous variable, thus the estimation was done using OLS technique.

Grossman model was extended by Rosenzweig and Schultz (1982) who assumed that a family obtains satisfaction from three main types of goods, that is the child health, *H;* consumer goods *Y,* which affect *H* (health related goods) and consumer goods *X*, which are health-neutral that have no effect on *H*. Child health is affected by the level of *Y* goods, and other purchased health inputs such as healthcare services which are allocated because they direct or indirect contribute to child health outcomes.

Thus, the utility function of the family can be given as,

$$U = U(X, Y, H) \quad (1)$$

The effect of *Y* and *Z* on child health can further be demonstrated as;

$$H = F(Y, Z, \mu), F_y, F_z, F_\mu \neq 0 \quad (2)$$

where μ is an unknown and can be viewed as health endowment resulted from genetic or environmental effect. The family maximizes given utility function (1), given equation (2), subject to the below budget constraint (3) being defined as;

$$I = XP_x + YP_y + ZP_z \quad (3)$$

Where, P_x, P_y, P_z are the prices of the health-neutral and health-related consumption goods and child health investment goods, respectively, and *I* is an income

From the above frameworks, it is clear that child health cannot be purchased directly by parents; it would rather purchase other goods which must be used as the mechanisms/pathways to create effect on health as illustrated in equation (2), and also production of some goods need to sacrificed in order to produce optimal child health outcome as described in Grossman model in chapter two. In this study production of child health has been guided by the following function,

$$H_C = H_C\left(N; A, B_{H,}, \mu\right) \quad (4)$$

Where *H* measures health outcomes, in this study child HAZ, *N* represents health inputs and behaviours, in this study access to health care services, drinking boiled water and also nutrition intake are considered as inputs. The highlighted inputs and behaviours are said to be under the control of the individual (parents). *A* consists of socio-demographic related features such as age and gender of children. B_H includes factors related to parental SES. μ represents unobserved features by a researcher but probably some are observed by the researched respondent. Framework (4) is also subjected to budget constraint as that of equation (3).

3.9.2 The Probit regression model

High HAZ values (above -2 standard deviation) indicate better child nutritional outcomes, and low height-for-age Z-scores is termed as stunted growth (stunting). The study was interested to measure groups of stunted children and link this group with SES indicators, because grouping stunting creates two categories of one is a child being stunted and the other is a child not being stunted, because the categorization is a binary choice thus this permits the use of probit model.

In this study, a probit model is used to estimate the probability of child stunting, following Gujarati (2008); Mukong and Burns (2017), the underlying unobserved latent variable Yi is defined for a vector of observable explanatory variables X by a statistical model.

$Y_{it}^{*} = X_{it}\beta + \varepsilon_i$

So that $Y_i = \begin{cases} 1 \; if \; Y^{*} > 0 \\ 0 \; otherwise \end{cases}$

Where Y_{it}^{*} is the underlying latent variable of whether or not an individual child at time t is stunted and X_{it} is a vector of explanatory variables which vary with time which includes age, parental education, household occupation, employment, household income, health related behaviour at time *t*. Thus the probability that a child is stunted can be represented as;

$$\Pr\left(y_{it} = \frac{1}{X_{it}}\right) = \Phi(X_{it}\beta)$$

Where y_{it} = 1 implies the child is stunted, β is a vector of parameters to be estimated, and Φ represents a standard normal cumulative density function.

Specifically the equivalent empirical model of equation may be expressed as follows:

$$Y_{it}(CH_{it}) = \beta_0 + \beta_1 child\ age + \beta_2 hh\ income + \beta_3 hh\ occupation + \beta_4 Number\ of\ children + \beta_5 health\ related\ behaviour + \beta_6 Household\ size + \beta_8\ parental\ education$$

3.9.3 The Ordered Probit Model

The second dependent variable is child SRH status, which is of discrete values with a logical ordering. Specifically, the SRH status H_i for child *i* has 4 possible outcomes which are assumed to be determined by the latent health status H_i^*.

The model is defined as follows

$$H_i^* = X_i'\beta + \alpha_i + u_i,\ i = 1, \dots n$$

$$H_i = j\ \ if\ m_{j-1} < H_i^* \leq m_j, j = 1, \dots 4$$

Where the boundaries $m_0 = -\infty$ and $m_4 = \infty$ and X_i is a vector of all explanatory variables of household socioeconomic status indicators, child specific characteristics. Self-Reported-Health (SRH), which has four categorical outcomes (poor, fair, good, and excellent SRH), was recoded in the survey. SRH as a measure of health, those who self assess in poor health status are worse off than those who provide self assess in other health status categories.

3.9.4 Decomposition analysis

This analysis provides an insight on the total child health differences between the two areas that is; it seeks to provide an answer on what is the child health gap between rural and urban areas, and understanding the contributing variables to the observed child health gap.

3.9.4.1 Decomposition of the Rural-Urban gap using HAZ as an outcome

To understand the prevailing rural-urban disparity in child health, the Oaxaca and Blinder decomposition was used to decompose the observed child health gap, which provides the existing gap the for the two population groups, in this study consideration is on rural and urban population as the groups being studied.

Adopting O'Donnell and Wagstaff (2008); Mukong and Burns (2017), to obtain the rural-urban gap in child outcomes is by using child health equation below;

$$CH_{ir} = \beta_{ir} X_{ir} + \varepsilon_i \quad (1)$$

Where i is individual child, r is child residential type, CH_i child health for urban/rural (HAZ for this study), X_i is the explanatory variable of child health, β_i coefficient, and ε_i is an error term. Oaxaca-Blinder decomposition approach provides the difference between the health outcomes of the urban and rural children into the observed and unobserved portion as shown below;

$$CH^{urban} - CH^{rural} = (\bar{X}^{urban} - \bar{X}^{rural})\hat{\beta}^{urban} + \bar{X}^{rural}(\hat{\beta}^{urban} - \hat{\beta}^{rural}) \quad (2)$$

$$CH^{rural} - CH^{urban} = (\bar{X}^{urban} - \bar{X}^{rural})\hat{\beta}^{rural} + \bar{X}^{urban}(\hat{\beta}^{urban} - \hat{\beta}^{rural}) \quad (3)$$

Where $\Delta\bar{X}=\bar{X}^{urban} - \bar{X}^{rural}$ and $\Delta\hat{\beta} = \hat{\beta}^{urban} - \hat{\beta}^{rural}$

$$CH^{urban} - CH^{rural} = \Delta\bar{X}\hat{\beta}^{rural} + \Delta\beta\bar{X}^{urban}$$

In equation (2) the first part of the right hand side is the explained portion resulted from the existing differences among observables characteristics between the residences keeping coefficient portion constant. Second part of equation (2) is unexplained portion resulted from unobserved behavioral effects keeping observable characteristics constant. Mussa (2014) stress on explained and unexplained gap though using an example which assumes that urban and rural households have the same household income levels (this as observable characteristics), household in both

residences can have the same income levels but vary in spending decisions (this is now unobserved characteristics).

Likewise in interpreting the observed characteristics using this technique one has to keep constant the unobserved portion of the model.

3.9.4.2 Non-Linear Decomposition of the SRH Rural-Urban gap

Oaxaca and Blinder decomposition technique accommodates linear models, because SRH is a non-linear outcome, Fairlie non-linear decomposition technique is used to estimate the existing gap in SRH. The technique accepts the binary outcome variable, and thus in this study SRH was dichotomized into a binary outcome; excellent health/good health were recoded as 1 value and fair/poor health were recoded as 0 value. Fairlie (2005) show that from a non-linear equation, $Y = F(X\hat{\beta})$; non-linear decomposition equation particularly for binary outcome variables can be written as:

$$\bar{Y}^U - \bar{Y}^R = \left[\sum_{i=1}^{N^U} \frac{F({X_i}^U \hat{\beta}^R)}{N^U} - \sum_{i=1}^{N^R} \frac{F({X_i}^R \hat{\beta}^R)}{N^R}\right] + \left[\sum_{i=1}^{N^U} \frac{F({X_i}^U \hat{\beta}^U)}{N^U} - \sum_{i=1}^{N^U} \frac{F({X_i}^U \hat{\beta}^R)}{N^U}\right] \quad (1)$$

Where the sample size of the group can be represented by *N*, an average probability of the rural-urban gap is represented by left side equation, and the variation based on measured covariates value differences are in the enclosed brackets in the right brackets. *F* represents the cumulative distribution of the logistic distribution.

Estimating the contribution in the entire set of independent variables to the rural-urban gap in the dependent variable; Fairlie (2005) assumed that $N_U = N_R$ that was to ensure the existence of natural one-to-one matching of urban and rural observations.

However, using coefficient estimates from a probit regression for a pooled sample,$\hat{\beta}^*$, the independent contribution of X_1 to the rural-urban gap can be expressed as:

$$\frac{1}{N^R}\sum_{i=1}^{N^R} F(\hat{\propto}^* + {X_{1i}}^U \hat{\beta}_1^* + {X_{2i}}^U \hat{\beta}_2^*) + F(\hat{\propto}^* + {X_{1i}}^R \hat{\beta}_1^* + {X_{2i}}^U \hat{\beta}_2^*) \quad (2)$$

Likewise, the contribution of X_2 can be expressed in form of;

$$\frac{1}{N^R}\sum_{i=1}^{N^R} F(\hat{\propto}^* + {X_{1i}}^U \hat{\beta}_1^* + {X_{2i}}^U \hat{\beta}_2^*) + F(\hat{\propto}^* + {X_{1i}}^R \hat{\beta}_1^* + {X_{2i}}^R \hat{\beta}_2^*) \quad (3)$$

The contribution of each variable to the gap is therefore equal to the change in the average predicted probability from replacing the urban residence distribution with the rural residence distribution of that variable while holding the distributions of the other variable constant.

3.10 Econometric Test

Data collected from the survey were subjected to different econometric and statistical tests in order to ensure that they are suitable for use and provide best and valid results. Example measurement error on using SRH as an outcome may arise, which is resulted from reporting heterogeneity that occurs when subgroups of the population use systematically different cut point levels when reporting their SRH (Jones & Rice, 2013). Econometric test is therefore needed on heteroskadasticity as to account for the occurrence of measurement errors. Further the study undertook the diagnostic test on multicollineality and endogeneity problems. The multicollineality problem is likely to cause partial regression coefficient to be not estimated precisely.

Endogeneity arises when the independent variables is correlated to one of the excluded exogenous variable which is regarded to be embodied in the error term (Mugo, 2012). Household income has long been regarded as endogenous variable being correlating with parental education when estimating child health outcomes. Through Instrumental variable approach, income was treated as endogenous variable. Existence of endogeneity causes the endogenous variable coefficient to fail in representing its true effect on the dependent variable that is regarded as being bias.

CHAPTER FOUR

PRESENTATION OF THE FINDINGS

4.1 Introduction to Findings

This chapter presents the study findings. The findings are presented basing on the research objectives highlighted in the first chapter. The presented findings are in descriptive statistics, regression analysis and decomposition analysis.

4.2 Descriptive Statistics

The summary of the descriptive statistics are presented in table 4.1 and table 4.2. Table 4.1 presents summary statistics for continuous variables and table 4.2 presents summary statistics for categorical variables.

Table 4.1 Summary statistics for continuous variables

Variable	Observation	Mean	Minimum	Maximum
Household Income	308	116285	2000	1500000
Household size	308	5	2	12
Child number	308	1	1	3
Height-for-Age Zscore	308	-1.64	-6.11	2.19
Child height	308	90.4	71.8	111
Age of a child (months)	308	38	24	58

Source: Research findings (2019)

The summary of the descriptive statistics presented in table 4.1 include variables such as height-for-age z-scores (HAZ), number of children under five in a given household, household size, child age, and household income.

Table 4.1 shows that the average height-for-age z-score of the children aged 24-59 months were -1.64 with a minimum of -6.14 z-scores and maximum of 2.19 z-scores. The surveyed children had the height average of 90 centimeters, with the maximum of 111 centimeters and also the minimum of 71.8 centimeters. Further the table reveals that surveyed children had the average of the 38 months, the minimum age of children was 24 months and maximum age was 58 months.

Household income was averaged at 116285 Tshs monthly income having 2000 Tshs as the minimum monthly income and 1500000 Tshs as the maximum monthly income. The average household size was 5 members with the maximum of 12 members and minimum of 2 members. The household surveyed had at least 1 child below five, and 3 children were the maximum number of children found in a single household.

Table 4.2 Summary Statistics for categorical variables

Variable	Observation	Mean	Percentage
Mother Education	308		
Uneducated		0.12	12.0
Primary education		0.61	61.4
Secondary education		0.24	24.0
College/University education		0.03	2.6
Father Education	308		
Uneducated		0.08	7.8
Primary education		0.63	63.0
Secondary education		0.24	23.7
College/University education		0.06	5.5
Parental occupation	308		
Farmers		0.44	43.5
Non-farmers		0.56	56.5
Difficulty Respiratory Infection	308		
Diarrhea illness		0.15	14.6
Fever		0.14	14.0
Coughing/Flu Infection		0.35	35.1
None infection		0.36	36.4
Clinic Visit (Yes)	308	0.81	81.5
Clinic Visit (No)		0.07	6.8
Clinic Visit (Rarely)		0.12	11.7
Nutrition Intake (Yes)	308	0.43	42.5
Nutrition Intake (No)		0.21	21.4
Nutrition Intake (Rarely)		0.36	36.0
Drinking boiled water (Yes)	308	0.35	35.1
Drinking boiled water (No)		0.65	64.6

Source: Research findings (2019)

In table 4.2 it can be observed that mother education had four categories, where 61 percent of the mothers in the studied households had attained a primary education. Uneducated mothers were found to occupy 12 percent, and only 3 percent of the studied mother had college/university education. Father education summary statistics shows that 63 percents of fathers had attained primary education, and only 5.5 percent had college/university education.

Table 4.2 further shows that 35 percent of the studied children had coughing and flu infection in both residences, and 36 percent of children had no difficulty respiratory infection. The studied children were found to be attending clinics regularly having 81.5 percent, where 6.8 percent of children were regularly attending clinics, mostly children who were about to attain full 5 years of age had stopped attending clinics.

Nutrition intake among children was 42.5 percent, this show that the number of children that was able to access enough nutritious food a week before the survey was below. This gives the implication of limited nutritious food intake among children in the studied residences. Children who had not fully accessed nutritious food consisted of 21 percent. Also the studied households had limited behaviour of boiling drinking water as it appears that only 35.1 percent of households boiled drinking water.

Children being stunted were considered into two values which are 0 and 1. Value of 1 denotes a child being stunted, that is $HAZ < -2\ Std\ deviation$ and also value of 0 denotes a child being not stunted. From table B.2 in the appendix, it can be observed that children taking the values of 0 (who are not stunted) are 193 in both residences, this account for 62.7 per cent of the total studied population. Stunted children in both residences are 115 which is 37.3 per cent of the total population. The table further shows that stunted children are more in rural residence which is recoded to be 91 children compared to urban residence having 24 stunted children within the study population; this can be confirmed by the figure below.

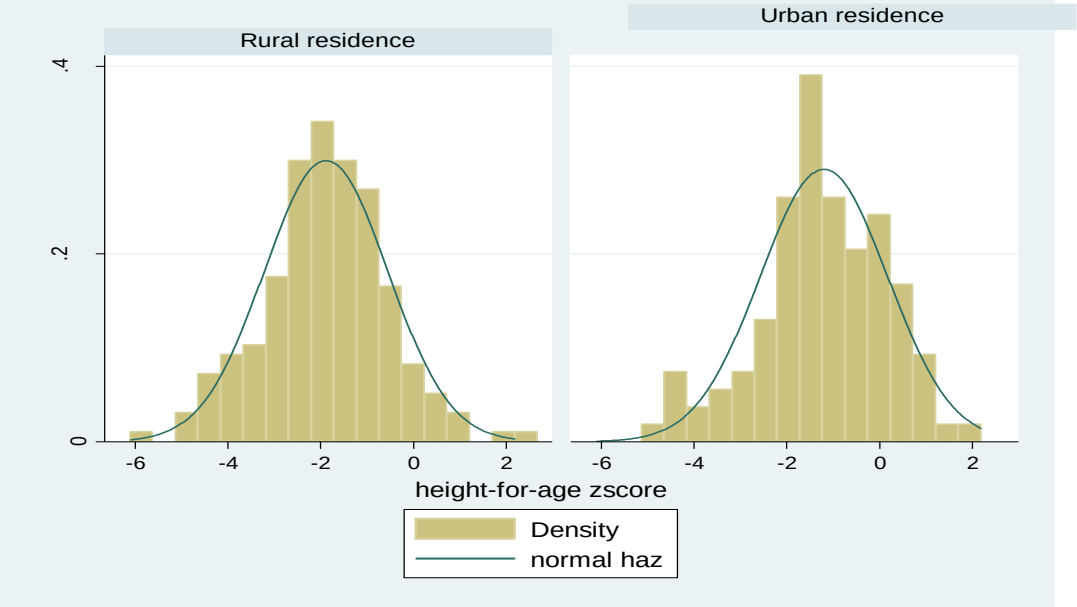

Figure 4.1 Height for Age Z-scores by Residences

Source: Research findings (2019)

The figure 4.1 shows that histogram of HAZ in urban residence is more skewed to the right compared to the rural residence which is skewed in the centre. It can be interpreted that number of stunted children is very low in urban residence compared to rural residence where the number of stunted children is almost the same with number of children who are not stunted.

Poor self reported health is more reported in rural area having 60 children with poor health compared to 19 children who were reported to have poor health in urban area. Also, excellent self reported health is more reported in urban residence with 31 children having excellent health, and 24 children out of 198 in rural residence were reported to have excellent health. As it was expected children who were found to be stunted were also reported to have poor health as it is observed in the figure 4.2 below.

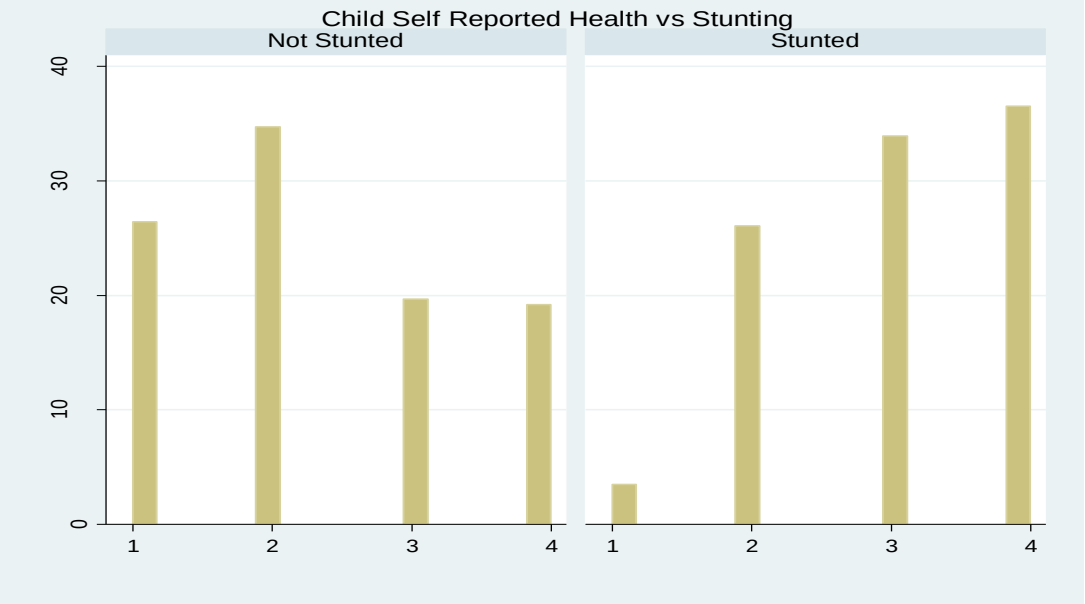

Figure 4.2 Child Self Reported Health and Stunting

Source: Research findings (2019)

4.3 Effects of household socioeconomic status on child nutritional status

The first objective of this study was to examine the effect of household socioeconomic status on child nutritional status using height-for-age Z-score as an outcome. To analyze the effects of socioeconomic status, Ordinary Least Square (OLS) was used. Instrumental variable approach was used as to examine possibility of the presence of endogeneity problem. Household income was treated as an endogenous variable, and parental education was treated to be relating to the selected endogenous variable. The diagnostic test done (Wu-Hausman, p=0.2477) on endogeneity do not signify the presence of endogeneity, using IV would inappropriate thus OLS is used instead.

The OLS regression results are in table 4.3 below, results which include both residences regression show that father education, household income, coughing/flu infection, nutrition intake, drinking boiled water, and gender of a child are the variables that are significant at different levels. In urban residence only mother education, rarely clinic visits, nutrition intake, drinking boiled water, and gender of a child are significant at different levels. In rural residence; father education,

coughing/flu infection, drinking boiled water, and gender of a child are only significant. In urban residence regression, some dummies of mother education (collage/university level) and father education variables were removed from the regression as to handle the problem of multicollineality in the model.

In the regression that includes all residences, the coefficient of both fathers' primary education and secondary education were positive and significant at 5 percent level and 10 percent level respectively. That is other factors being held constant, fathers' primary education and secondary education increase the height for age z-scores. A child whose father had a primary education was 0.64 height-for-age z-scores in both residences and 0.62 z-scores in rural residence, higher than child whose father had no education. The significance of father education can be due to the high bargaining power in family which probably influences positively the nutritious food intake behavior within the households among children. Father education in urban areas was statistically insignificant at all levels but had the positive relationship with HAZ.

Mother education was statistically insignificant at levels in the regression which included all residences, but in urban residence it was statistically significant at 10 percent in regression that involved only urban residence. A mother with college/university education was found to lower HAZ by 0.65, keeping other factors constant.

The coefficient of household income was found to be statistically significant at 5 per cent in regression that included all residences. Keeping other factors constant, HAZ increased by 0.16 z-scores with a unit increase in household income. Significance of income could probably portray that households with high income are capable at purchasing nutritious food and access health care services for their children, which ultimately affect positively their children HAZ. Income indirectly affected HAZ in the regression that involved separating urban and rural residences.

Nutrition intake behavior was considered as channel through which SES affect HAZ; it was examined through identifying whether a child was able to have nutritious food in the last week from the surveying day. The results from regression in all residences

show that children who had no access to nutritious food together with those who rarely accessed nutritious food, were significant at 1 per cent. A child who had no access in nutrition food a week before the survey was -0.75 height-for-age z-scores lower than those who accessed nutritious food. Specifically in urban residence holding other factors constant, a child with no access to nutritious food was -1.67 height-for-age z-scores lower than children who had access to nutritious food. Likewise to a child who had rarely accessed nutritious food in urban areas was -0.65 height-for-age z-scores lower than children who had access to nutritious food, under ceteris paribus. In rural residence nutritious intake among children who had no access to nutritious food together with those who rarely accessed nutritious food, were statistically insignificant at all levels and had a negative relationship with HAZ, this provides the implication of nutrition intake had a weak linkage with SES on child nutrition status in rural areas.

Gender of a child was found to be positive and statistically significant at 5 percent. This reveals that girls tend to have higher nutritious status compared to boys. Findings obtained shows that girls' height-for-age z-scores was 0.40 in average higher compared to boys in the regression that included all residences, holding other factors constant.

Drinking boiled water was examined by asking the respondents whether they boil drinking water for their children. Coefficient of children who had no access to drinking boiled water was significant at 5 percent in all residences, and it was significant at 10 per cent in the separated regression of two residences. A child who had no access to drinking boiled water decreased HAZ by 0.45 units in the regression that included all residences, under ceteris paribus. Children HAZ decreased by 0.50 in rural residences, holding other factors constant.

Difficulty in chronic illness was examined basing on three main illness which are diarrhea, fever, and coughing/flu infection, and also none chronic illness. The respondents were asked whether a child had experienced any chronic illness among the mentioned above in one or two weeks before the survey. The coefficient of coughing/flu was negative and significant at 10 per cent level. In all residences

regression, a child that experienced coughing/flu infection a week before survey was found to decrease HAZ by 0.41 compared to those who experienced diarrhea, holding other factors constant. In rural residence, a child having coughing/flu infection experienced a decreasing HAZ by 0.52 compared to those having diarrhea. Coughing/flu infection was negative and statistically insignificant in urban areas.

Table 4.3 Effects of socioeconomic status on child nutritional outcomes

Variables	**All Residences**		**Urban Residences**		**Rural Residences**	
Variables	**Coefficient**	**P-values**	**Coefficient**	**P-values**	**Coefficient**	**P-values**
HAZ						
Mother Education						
Primary level	0.095	0.686	-0.532	0.155	0.334	0.207
Secondary level	-0.131	0.641	-0.652	0.083	0.183	0.613
College/university	0.064	0.901			1.348	0.330
Father Education						
Primary level	0.642	0.023			0.621	0.053
Secondary level	0.566	0.074			0.644	0.102
College/university level	0.749	0.089			0.384	0.657
Parental Occupation						
Farmers	0.083	0.622	0.210	0.525	0.257	0.296
Difficulty Respiratory Infection						
Fever	-0.050	0.855	-0.038	0.916	-0.104	0.768
Coughing/Flu Infection	-0.410	0.075	-0.230	0.467	-0.523	0.095
None infection	0.076	0.744	0.523	0.113	-0.174	0.581
Clinic Visits						
No clinic visits	-0.147	0.620	-0.128	0.736	-0.315	0.378
Rarely clinic visits	-0.336	0.146	-0.582	0.158	-0.232	0.443
Nutrition Intake						
No nutrition intake	-0.758	0.000	-1.676	0.002	-0.407	0.112
Rarely nutrition intake	-0.280	0.124	-0.659	0.013	-0.044	0.861
Drinking boiled water						
No drinking boiled water	-0.448	0.015	-0.342	0.191	-0.499	0.053
Log of household size	0.011	0.957	0.148	0.584	0.042	0.878
Log of Income	0.167	0.019	0.154	0.200	0.098	0.281
Gender of a Child						
Female	0.399	0.007	0.413	0.078	0.420	0.031
R-squared	23.200		39.200		14.600	
Number of Observations	308.000		110.000		198.000	

Source: Research findings (2019)

Household occupation status was positive but statistically insignificant at all levels, implying that parents being farmers influence the child nutritious status indirectly compared to non-farmers. It was expected that parents being farmers would probably make food available for their kids and consequently increase HAZ among children.

The study further adopted the IV approach using 2SLS as to compare the results obtained from OLS model, this is because the OLS estimators are characterized by endogeneity and heterogeneity biases. Household income was treated as an endogenous variable and parental education was considered as instrumental variables. The results obtained from both models are not much different. Though household income was found to be insignificant in IV 2SLS (results are attached in appendix 3) and it was significant at 5 per cent in OLS estimation. It is not very much likely to conclude that significance of household income in OLS estimator are driven by endogeneity, because the similar studies done on same the topic have concluded on the positive influence of household income on child health. Vividly the insignificance of household income in IV model might have been driven by the instruments chosen such that the tests done on IV/2SLS reveal that the Durbin (score) chi2 and Wu-Hausman F-tests are statistically insignificant, thus we fail to reject the null hypothesis. The Sargan (score) (1.095; p-value= 0.578), tests of over-identifying restrictions fails to reject the null hypothesis that instruments are valid. However, this gives the guarantee of relying on the estimation obtained from the OLS model.

4.3.1 Results from the Probit model

The results obtained from the Probit model explain the effect of household socioeconomic status on child health using stunted growth as a dependent variable. The model was used as to ensure that results obtained from using OLS are not due to the model chosen. Variables such as area of residence, father primary education, nutrition intake, household income, gender of a child, child age group were found to be statistically significant. The results of probit model are attached in the appendix section (*table C.2*).

The coefficient of father primary education was found to be negative and statistically significant at 5 per cent. The marginal effect was found to be 0.33; this shows that a child whose father had primary education decreases the probability of stunted growth by 33 per cent, holding other factors constant. Father secondary education was significant at 10 per cent; it shows that the probability of having stunted growth decreases by 22 per cent if a father had attained secondary education.

The coefficient of household income was negative and statistically significant at 1 per cent. The marginal effect was 0.11. The probability of child being stunted was 11 per cent lower for a child born in a household with high income. This implies that household whose income is high are likely to get necessary food nutrients which alter child growth.

Children who had no access to nutritious food were more likely to be stunted having the probability of 17 per cent. Also, the marginal effect of a child who had access to nutritious food was -0.16; this implies that nutrition intake among children decreases the probability of having stunted growth by 16 per cent, ceteris paribus.

The marginal effect of children aging 24-36 months was 0.23 and it was significant at 5 per cent. This implies that holding other factors constant, the probability of having stunted growth increases by 23 per cent to children aging 24-36 months compared to those aging 37-59 months. Also, male children were more likely to have stunted growth compared to female. The probability of male children to have stunted growth was found to increase by 15 per cent, holding other factors constant.

Generally, variable such as access to drinking boiled water is not statistically significant as it is in the results obtained in OLS/ IV instrument variable. This confirms that results obtained in all models give similar results despite the variation that occurs in the interpretation, it can therefore be confirmed that results in all models are not driven by the nature of the model used.

4.4 Effects of household socioeconomic status on child Self Reported Health (SRH)

SRH was examined by asking the respondents on how they would describe their children health in relation to the children of their age. Four main categories of SRH were expected to be obtained from the respondents; these are excellent health, good, fair, and poor health. Assessment of the relationship between SES and SRH involved employing ordered probit regression and the interpretation were done using marginal effects as it happens that marginal coefficients give the direct probabilities interpretation, and the results are presented in table 4.4.

Table 4.4 Marginal effects of Ordered Probit model on Excellent SRH

Variable	Both residences		Urban residence		Rural residence	
SRH	dy/dx coefficient	P-Values	dy/dx coefficient	P-values	dy/dx coefficient	P-values
Household income	0.002	0.869	-0.019	0.64	-0.002	0.889
Mother primary education	0.033	0.391	0.252	0.113	0.008	0.801
Mother secondary education	-0.007	0.894	0.260	0.192	-0.029	0.497
Mother higher education	0.188	0.244	0.431	0.094	0.910	0.000
Father Primary level	0.005	0.908	-0.311	0.058	0.013	0.746
Father Secondary level	0.110	0.107	-0.178	0.246	0.106	0.203
Father higher education	0.103	0.369	-0.169	0.192	-0.016	0.885
Farmers (occupation)	0.007	0.819	-0.026	0.702	0.024	0.434
Diarrhea illness	-0.100	0.001	-0.241	0.000	-0.039	0.249
Fever illness	-0.092	0.005	-0.244	0.000	-0.018	0.678
Coughing/flu infection	-0.079	0.009	-0.263	0.000	-0.018	0.542
No clinic visit	-0.054	0.22	-0.160	0.068	-0.028	0.523
Rarely clinic visit	-0.033	0.371	-0.107	0.07	-0.003	0.937
No nutrition intake	-0.161	0.000	-0.182	0.001	-0.125	0.000
Rarely nutrition intake	-0.094	0.002	-0.211	0.001	-0.054	0.089
Drinking boiled water	0.034	0.358	-0.042	0.599	0.045	0.29
Child Age group (24-36)	-0.018	0.549	-0.009	0.912	-0.017	0.55
Marginal prediction of excellent health (%)	14.18		22.9		9.5	
Number of Observation	308		110		198	

Source: Research findings (2019)

The results in table 4.4 obtained from the regression show that difficulty in chronic illness, access to boiled water, nutrition intake, and mother education were statistically significant at different levels. In the regression that includes all

residences nutrition intake and difficulty in chronic illness appear to be significant at 5 per cent. In urban residence, father primary education, mother higher education, nutrition intake, drinking boiled water and difficulty in chronic illness were significant at 5 per cent.

The coefficient of mother with higher education was found to be significant at 10 percent in urban residence. The probability of reporting excellent health increased by 43 percent among children whose mother had higher education, holding other factors constant. Likewise in rural residence, reporting excellent health was found to increase by 91 percent among children whose mother had higher education. Father primary education in urban residence was found to lower reported child excellent health by the probability of 31 percent.

Difficulty in chronic illness was examined basing on diarrhea illness, fever illness, coughing/flu infection, and also none illness was used as base category. The outlined categories' coefficients were negative and statistically significant at 1 per cent and 5 per cent in all residence regression and in urban residence. The coefficient of difficulty in chronic illness categories was statistically insignificant in rural residence. Reported diarrhea illness in all residences regression decreases the probability of excellent health by 10 per cent compared to children who were reported to have none illness during two weeks before the survey, ceteris paribus. Fever illness and coughing/flu infection had a negative marginal effect of 0.09 and 0.079 respectively, and were statistically significant at 5 per cent in all residences regression. Holding other factors constant, children having fever illness and coughing/flu infection lowered the probability of reporting child excellent health by 9 per cent and 8 per cent respectively in all residences regression. This appears as it was expected since persistence of chronic diarrhea, fever and coughing infections are likely to affect social well being among children, and thereby creating poor health. Coefficient of difficulty in chronic illness in urban residence was also negative and appeared to be contributing greatly at lowering excellent health reporting among children.

The coefficient of children who were reported to be not visiting clinics regularly was negative and statistically significant at 10 per cent in urban residence. Children who were not visiting clinics regularly had -0.16 marginal effects. This gives the implication that being not visiting clinics among children aging 24-59 months lowers the probability of having excellent health compared to those children who visits clinics in urban residence. Rarely visiting clinics in urban residence also was found to lower the probability of reporting excellent health by 10.7 percent. Clinic visit had no a significant effect to children residing in rural areas.

Nutrition intake among children was captured by posing the question to respondents on whether a child was able to have nutritious food in the last week from the surveying day. As expected the marginal coefficients of no nutrition intake was negative and statistically significant at 1 per cent in all residence regression. Holding other factors constant, the probability of reporting child excellent health decreased by 16 per cent for children who were not regularly consuming nutritious food. Likewise for the rarely nutrition intake was negative and statistically significant at 1 per cent in the regression that includes all residences, and it had marginal effect of -0.094. This shows that under ceteris paribus, limited nutritious food consumption decreases the probability of reporting excellent health among children by 9.4 per cent.

Finally, The insignificant of socioeconomic variables might have been contributed by; first, measurement errors which are associated with misreporting by the respondents studied and second, excluded socioeconomic variables and the relevant channels through which the household socioeconomic variable affect SRH.

4.5 Linkage between household socioeconomic variables, intervening variables (pathways) and child health outcomes

In order to identify the existing relationship among the identified variables, structural equation modeling was applied. Two structural models defining the linkage between different two child health outcomes were modeled and maximum likelihood method was used for estimation, these two models structured were HAZ model and SRH model as observed in table 4.5. The household socioeconomic indicators included are parental education, household size, household income and parental occupation, and

intervening variables involved in modeling the linkage are nutrition intake, clinic visit and drinking boiled water.

The HAZ model results from table 4.5 demonstrate that the included household socioeconomic indicators had a relationship with drinking boiled water, that is they were all significant at all levels. Paternal education, household income and parental occupation were found to be significant at 5 per cent implying having the effect on nutrition intake. Only household income had effect on clinic visits.

Table 4.5 SEM analysis results showing relationship between household socioeconomic indicators and intervening variables (pathways)

SES ->Pathways	**All Residences**		**Urban Residence**		**Rural Residence**	
Nutrition Intake	Coefficient	P-values	Coefficient	P-values	Coefficient	P-values
Mother education	0.036	0.657	0.177	0.153	-0.061	0.564
Father education	-0.227	0.004	-0.301	0.014	-0.176	0.104
Occupation	0.209	0.059	0.160	0.458	0.274	0.067
Log of household size	-0.047	0.732	0.169	0.478	-0.102	0.541
Log of household Income	-0.078	0.076	-0.203	0.012	-0.035	0.511
Clinic Visits						
Mother education	0.029	0.64	0.020	0.832	0.022	0.791
Father education	-0.013	0.838	-0.098	0.283	0.047	0.589
Occupation	0.023	0.79	0.206	0.204	0.010	0.935
Log of household size	0.055	0.606	-0.053	0.767	0.145	0.278
Log of household Income	-0.079	0.022	-0.088	0.149	-0.084	0.047
Drinking Boiled water						
Mother education	-0.076	0.056	-0.070	0.27	-0.070	0.171
Father education	-0.125	0.002	-0.087	0.165	-0.115	0.03
Occupation	0.131	0.018	0.228	0.038	0.032	0.664
Log of household size	0.112	0.1	0.185	0.127	0.071	0.381
Log of household Income	-0.075	0.001	-0.129	0.002	-0.053	0.041

Source: Research findings (2019)

The included intervening variables (pathways/channels) were all found to have strong effect on height-for-age z-scores. These variables were significant at 1 per cent and 5 per cent: nutrition intake (0.000 p-values), drinking boiled water (0.000 p-values), and clinic visit (0.013 p-values). This confirms that the included channels

were appropriate to link household socioeconomic status and nutritional status of children in Kagera region.

The SRH model results (in table 4.5) reveal that nutrition intake (0.003 p-values) and drinking boiled water (0.002 p-values) are significant at 1 per cent, thus they are the essential pathways that link household socioeconomic indicators and child self-reported health (SRH). Paternal education (0.004 p-values), household income (0.076 p-values) and parental occupation (0.0054 p-values) were found to affect nutrition intake. The included household socioeconomic indicators were found to affect drinking boiled water behaviour, and household income (0.001 p-values) and paternal education (0.002 p-values) appeared to have a strong effect on drinking boiled water.

On the other hand the effects of household socioeconomic indicators on separated residences show that father education and household income have effect on nutrition intake in urban residence, in rural residence only occupation had effect on nutrition intake. Clinic visit was not related with any of selected household socioeconomic indicators in urban residence, but was found to affect household income in rural residence. Also, father education and household income are key indicators that affect drinking boiled water in rural residence.

4.6 Estimation of rural-urban child health gap

To quantify the existing gap in child health between rural and urban residences, twofold Blinder-Oaxaca decomposition and Fairlie non-linear decomposition technique were used. The twofold Blinder-Oaxaca decomposition was used to estimate the gap using HAZ as an outcome. This analysis divides the obtained gap into two parts, which are explained and unexplained parts. HAZ was decomposed independently using *Oaxaca* command in STATA software, in which the command requires one to specify the group to be decomposed.

Table 4.6 provides the results using Blinder-Oaxaca decomposition technique to determine the relative importance of observed together with unobserved components in accounting for urban-rural disparities. The obtained gap is divided into explained

that is the differences associated with observable characteristics, the differences resulted from unobservable characteristics are termed as unexplained.

Table 4.6 Blinder-Oaxaca decomposition results using HAZ as an outcome

HAZ	Coefficient	Robust Std. Err.	P-value
Overall Estimation			
group_1 (Rural)	-1.886	0.0945	0.000
group_2 (Urban)	-1.200	0.130	0.000
Difference (Gap)	-0.685	0.161	0.000
Explained	-0.491	0.119	0.000
Unexplained	-0.194	0.115	0.093
Number of Observation	308		

Source: Research findings (2019)

In estimating HAZ, the results suggest that both observed and unobserved components were significant at 1 per cent and 10 per cent respectively. Further the table shows that children from rural residence had lower average of height-for-age z-scores compared to children from urban residence. More specifically, the estimated height-for-age z-scores average was -1.89 in rural residence and -1.20 in urban residence, in which this gives the total difference (gap) of -0.68 z-scores unit, the observed(explained) variables in the model can explain 72 per cent of the total gap; the other 28 per cent can be explained unobserved components (unexplained). However, the unexplained portion of tries to notify the number of socioeconomic factors that were not captured in the model.

The table 4.7 presents the contribution of each variable to the observed rural-urban gap in child health. In the explained portion of HAZ, variables such as drinking boiled water, father with no education, and household income are significant at 5 per cent at explained portion.

Table 4.7 Contribution of the explanatory variables to the explained rural-urban gap

HAZ	Coefficient	Robust Std. Err.	P-value
Mother with no education	0.003	0.049	0.948
Mother's primary education	0.018	0.062	0.772
Mother's secondary education	0.030	0.086	0.728
Father with no education	-0.079	0.040	0.048
Father's primary education	-0.040	0.078	0.607
Father's secondary education	0.058	0.071	0.415
Parental occupation	0.032	0.092	0.724
Diarrhea illness	0.003	0.009	0.73
Fever illness	-0.007	0.015	0.644
Coughing/flu infection	-0.024	0.028	0.397
Nutrition intake (Yes)	-0.069	0.044	0.118
Nutrition intake (No)	-0.099	0.048	0.038
Drinking boiled water	-0.142	0.058	0.014
Clinic visit (Yes)	-0.009	0.014	0.53
Clinic visit (No)	0.006	0.013	0.649
Log of Household income	-0.181	0.078	0.021
Log of Household size	0.009	0.038	0.821
Explained	-0.491	0.119	0.000
Unexplained	-0.194	0.115	0.093
Number of Observation	308		

Source: Research findings (2019)

Holding other factors constant, drinking boiled water accounts for about 33 per cent of overall explained rural-urban gap, differences in household income between the residences accounts for 38 per cent of overall explained gap. Father with no education accounts for about 15 per cent, and limited nutrition intake among children accounts for 19 per cent of the total explained gap, ceteris paribus. The large portion of the explained gap in child health is due to differences in household income among the two residences, the implication of this is that if the level of household income in rural households was made equivalent to that in urban households, the overall rural-urban gap in child nutrition would been reduced by 38 per cent.

4.6.1 Fairlie non-linear decomposition results

SRH as an outcome is categorical in nature and therefore it had to be decomposed using Fairlie non-linear decomposition technique. Fairlie non-linear decomposition accepts the binary outcome variable, and thus SRH was dichotomized into a binary outcome; excellent health/good health were recoded as 1 value and fair/poor health were recoded as 0 value.

The results from nonlinear decomposition (table 4.8) show that the total rural-urban gap in predicted probability of having reported excellent child health is 0.12 points; this gap is obtained from the difference of predicted probability value among residences which is 0.55 points in urban residence and also 0.43 points in rural residence, urban residence are more likely to report excellent by 0.55 points compared to children in rural residence. The variables included in the model explain about 75 per cent of the total rural-urban gap and the remaining portion of about 25 per cent is explained by unobserved variables. This can therefore be interpreted that the obtained gap is mainly resulted from the observed characteristics of the studied population. Mother's primary education and nutrition intake are the explanatory variables that contribute to the existing gap and in such the variables are statistically significant at 10 per cent and 5 per cent respectively.

Keeping other factors constant, mother primary education contributes to about 22 percent of the explained gap on the probability of reporting excellent health; access to nutritious food contributes to about 45 per cent and also limited access to nutritious food account for 33 per cent of the explained gap.

In comparison using the same command of *fairlie* as to estimate the gap in stunting; children in rural residence had more probability points of stunting which was 0.45, and children had lower probability points of stunting which was 0.21 and this gave the predicted probability of rural-urban gap in stunting to be 0.24 points greater that of self reported excellent health. Household income and primary father education appeared to be mainly contributing variables to the observed gap in stunting.

Table 4.8 Fairlie non-linear decomposition results with the contribution of the observed characteristics to the explained rural-urban gap

SRH	Predicted Values		
Predicted value in rural residence	0.434		
Predicted value in urban residence	0.555		
Difference (rural-urban gap)	-0.120		
Total explained gap	-0.091		
Observed characteristics	**Coefficient**	**Std. Error**	**P-value**
Mother with no education	0.003	0.015	0.821
Mother's primary education	0.022	0.012	0.066
Father with no education	-0.006	0.013	0.663
Father's primary education	-0.026	0.026	0.318
Parental occupation	-0.034	0.048	0.480
Diarrhea illness	0.004	0.004	0.313
Fever illness	0.002	0.005	0.748
Coughing/flu infection	0.000	0.005	0.951
Nutrition intake (Yes)	-0.041	0.021	0.052
Nutrition intake (No)	-0.033	0.016	0.045
Drinking boiled water	-0.016	0.031	0.605
Clinic visit (Yes)	-0.006	0.006	0.283
Clinic visit (No)	0.004	0.006	0.478
Log of Household income	0.052	0.037	0.155
Log of Household size	-0.025	0.016	0.133
Number of Observation		**308**	

Source: Research findings (2019)

Nutrition intake appears again as one of attributable variable in narrowing the gap between the two outcomes (HAZ and SRH). This underpins the significance of nutrition intake among children as a key factor in improving the child health outcomes and it gives the clear evidence that improvement in nutrition intake policy is essential for narrowing the rural-urban gap in child health.

4.7 Post Estimation Results

4.7.1 Test of Endogeneity

The studies done on the similar topic have considered household income as endogenous variable, and they have then regarded parental education to have the relationship with household income.

Endogeneity arises when the independent variables is correlated to one of the excluded exogenous variable which is regarded to be embodied in the error term (Mugo, 2012). Through using two stage regressions, income was treated as endogenous variable. Existence of endogeneity causes the endogenous variable coefficient to fail in representing its true effect on the dependent variable that is regarded as being bias. The diagnostic test pertaining on Durbin-Wu-Hausman was done and findings are obtained below in table 4.9;

Table 4.9 Durbin-Wu-Hausman Test

Tests of endogeneity Ho: variables are exogenous	
Durbin (score) chi2(1) = 1.41325 (p=	0.2345)
Wu-Hausman F(1,291) = 1.3414 (p =	0.2477)

Source: Research findings (2019)

From the tests findings, the probability value of the Durbin-Wu Hausman test is greater than 0.05. Therefore the study fails to reject the null hypothesis and conclude that household income is exogenous variable.

4.7.2 Multicollineality Test

Multicollinearity is viewed as state of very high intercorrelations or inter-associations among the included independent variables in the model. It is therefore a type of disturbance in the data, and if found present in the data the statistical inferences made about the data would not be reliable.

The multicollineality problem is likely cause partial regression coefficient to be not estimated precisely, and also multicollinearity makes it difficult to assess the relative importance of the independent variables in explaining the variation caused by the dependent variable (Gujarati, 2008). Multicollineality was tested using The Variance Inflator Factor (VIF) as to find out whether the explanatory variables are correlated with each other. Here below (table 4.10) are the results obtained from VIF test;

Table 4.10 Variance Inflation Factor (VIF) test for Multicollineality

Variable	VIF	1/VIF
Father education 3	5.77	0.173321
Father education 2	4.51	0.221856
Father education 1	2.72	0.368026
log of income	1.64	0.610442
Nutrition intake (yes)	1.57	0.636753
Clinic visit (yes)	1.56	0.639503
Clinic visit (no)	1.56	0.642609
Drinking boiled water	1.46	0.68686
Difficulty in diarrhea	1.43	0.699393
occupation	1.38	0.727013
Nutrition intake (no)	1.35	0.74124
Fever illness	1.33	0.751009
Coughing/flu infection	1.24	0.80443
log household size	1.16	0.862925
log of child number	1.12	0.891391
Mother with no education	1.12	0.893559
Child age (24-36months)	1.1	0.912423
Mean VIF	1.88	

Source: Research findings (2019)

Multicollineality is identified when a variable whose VIF values are greater than 10, it is obvious that variable has severe multicollinealty. From the table above it can be observed that all explanatory variables were free from multicollineality despite the existence of moderate multicollineality in parental education. For precautionary purpose some of categorical variables of mother education were eliminated from several analysis and that is why they are not all included in VIF test above.

4.7.3 Test for Heteroskedasticity

Heteroskedasticity occurs when the variance of the error terms vary across the observation (Gujarati, 2008). Presence of heteroskedasticity in the estimates cause the standard errors to be biased and it could require one to use robust standard error estimator for the covariance matrix of the regression parameters as to solve the problem. In order to avoid the results obtained from the regression to have no spurious results, that is ensuring the data used for study have constant variance; heteroskedasticity test was done, and below are the results obtained.

The table 4.11 shows that probability values were statistically insignificant. Therefore the study fails to reject the null hypothesis of constant variance and concludes the model employed does not suffer from heteroskedasticity problem.

Table 4.11 Breusch-Pagan/Cook Weisberg test

.estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of haz

All Residence	Urban residence	Rural Residence
chi2(1) = 1.75 Prob > chi2 = 0.1854	2.36 0.1244	0.54 0.4624

Source: Research findings (2019)

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter establishes the discussion on the linkage between the obtained results from the analysis and the selected literature together with theories used in chapter two. This chapter points out the agreement and disagreement of the findings obtained from analysis done in relation to the findings obtained by other studies. The discussion is done in relation to the highlighted specific objectives in the first chapter which have been achieved through the regression and decomposition analysis done.

The study was guided by two theories; firstly, the fundamental cause theory which highlights an association between SES and the existing health disparity, and it also describes SES variation to influence multiple disease outcomes. Secondly, the Grossman model gives the implication of child health to be affected by the level of allocated market and non-market goods by the parents.

5.2 Household socioeconomic status and nutritional status

Parental education was found to be a significant variable that affect nutritional status among children. Parental education has been considered also by other studies as factor which influences child nutritional status (Huda *et al*., 2017; Kumar & Singh, 2015). Father education for example, a child whose father had primary education was found to have an increase of 0.6 height-for-age z-scores. In line with the employed human capital theory in Grossman model which posits the positive linkage between parental education and child health, however parental education is expected to influence child growth through acquisition of health knowledge, adherence to recommended child feeding nutritious food and being able to control the resources that can be useful in child growth (Huda *et al.*, 2017). Interestingly, mother education in urban residence was found significant and negative effect on child nutritional status, this is out of my expectation since a mother being educated in urban residence would obvious had a positive direct impact on her child's HAZ through nutritional knowledge pathway.

Household income was found to be significant at 5 per cent; it has been observed that children from high income households tend to have 0.18 higher height-for-age z-scores compared to children from low income households. Households let say those from urban residence are more likely to use their available income to invest in child health inputs. Wu (2011) emphasize that availability of child health-related inputs is high in urban areas such that the costs to access those inputs may be affordable to the majority even if they are poor, to the extent that poor households in urban area are able to make at least some basic investments in child health. This is different from rural households where investing in child health requires extra costs for households to easily access child health inputs. As the result of this poor households may not afford to make any investments in child health, which enlarges the gap of the nutritional status between urban and rural children and is as it is stressed by the fundamental theory cause which identifies disparity of resources as one of the contributor of persistence of disparity among regions.

The regression results of parental occupation do not show any effect on child health, it was expected parents who are farmers to have an impact on child height, such that being a farmer is mostly household-based, to the extent that parents may have more time at home and probably to provide more child health care. On the other hand parental occupation may have indirect impact on child health, such that its effects on child health is through a given pathways which might have been not included in the model.

Gender of child was found significant at 5 per cent, being a girl was found to have 0.41 higher HAZ compared to boys, this is consistent with literature (Novella, 2013), who confirmed that mothers prefer to allocate more resources to improve their daughters' health, and also maternal preferences affects child health, breastfeeding was considered as a mechanism through which the effects might occur. This happens as mothers spend most of their time with girls. Even slight differences in the distribution of scarce resources might have dramatic consequences on children's health and nutritional status.

5.3 Household socioeconomic status and Child self reported health.

Difficulty in chronic illness which consisted health problems related to diarrhea, fever, and also coughing/flu infection were found to be rampant in the study area especially in rural residence, and they were directly linked with poor health among children. In line with, Cai *et al*. (2017); Wu (2011) and TDHS (2015) have considered reporting poor health among rural children is due to lack of access to preventive and curative health services, which tend to cause worse nutrition and consequently poor health. They further point out that prolonged chronic illness may be resulting from poverty such as dirty water, lack of sanitation, and poor housing could also contribute to poor child health outcomes. Difficulty in chronic illness can be considered to be resulted from either genetic or environmental conditions uninfluenced by parental behavior as Grossman model emphasizes.

Mother education was found to be significant, example marginal effect of mothers with higher education was 0.910 in rural residence, which specify that probability of reporting child excellent health increases by 91 percent among mothers with higher education compared to those with no education. Effect of parental education on child health has been linked with reported health basing health knowledge which could probably be the key pathway by which parental education leads to excellent child health. Formal education provides greater opportunities for parents to interact with modern society, which makes them more aware to modern medical treatments and health related programs available in various social networks (Wu, 2011; Khaoya, 2017). The Grossman model considers the acquisition of non-market goods by parents to be one of the influencing factors of child health, this implies that availability and easy access of socio media in urban residence has something to contribute to high rate of reporting excellent health in urban residence in Kagera region.

Insignificant of other socioeconomic variables are consistent with the study done by Sponen *et al*. (2011) who confirmed that parental socioeconomic status is a more important determinant of reported health in adolescence than in childhood since in childhood the effect of parental socioeconomic background on children's health may

still be prevented. This is through prenatal care, child welfare clinics, and school health care where children's health is monitored regularly in several countries; parents are in such guided by the health Ministry laws to acquire the required health care services of their children. The perception of Sponen *et al.* (2011) on the influence of parental socioeconomic status on reported health in Finland could be judged basing on the environment the study was done. It is obvious contrary to have the same judgments in developing countries like Tanzania where access of child health care services is still a challenge. In support with Wu (2011) and Khaoya (2017) variation on effects of parental socioeconomic status on child health could be resulted from misreporting behavior among the respondents especially on self reported child health in the studied area.

Self reported health has been characterized by the limitation of subjectivity assessment of child health status; children or parents of different backgrounds may perceive and report current health status in systemically different ways, which makes the true disparities of health status between the rural and the urban children ambiguous. It is still questionable whether descriptions of health status such as excellent health, good/fair or poor go similar with the actual health status reported by the respondents. Wu (2011) show that the relationship between explanatory variables and self-reported health status may not represent the true underlying effects of these factors on child health. Therefore, one should not rush to make conclusion on the association between household socioeconomic status and self reported health. Insignificant of some of socioeconomic factors on reported health would have been therefore dragged by misreporting of respondents.

5.4 Linkage between household socioeconomic variables, intervening variables (pathways) and child health outcomes

In line with Grossman model it is evident that parents might not affect child health directly, they thus impact indirectly on child health through several health inputs in which in this study health inputs have been considered as channels or pathways. This is observed in figure 5.3 (below) and figure D.1 (attached in the appendix).

Nutrition intake, clinic visit and drinking boiled were the selected pathways and are confirmed to have significant impact with the included household socioeconomic indicators. Occupation, father education and household income have been found to affect health inputs mostly in all residences. Though, occupation indicator has more effect of about 20 per cent average on the identified channels compared to other socioeconomic indicators, and the relationship is more on nutrition intake and drinking boiled water. Interestingly, the effect of father education and household income on pathways is negative; this might be because these two indicators affect child health into two ways which is directly and indirectly. This can be further perceived as it was documented by Maiga (2015) who asserts that negative relationship between a pathway and an indicator is due to substitute effect, and also positive relationship verify the complement effect. The substitute effect mean that the two variables are substituted to each other to affect child health and also complement effect imply that the two variables work to together to affect child health.

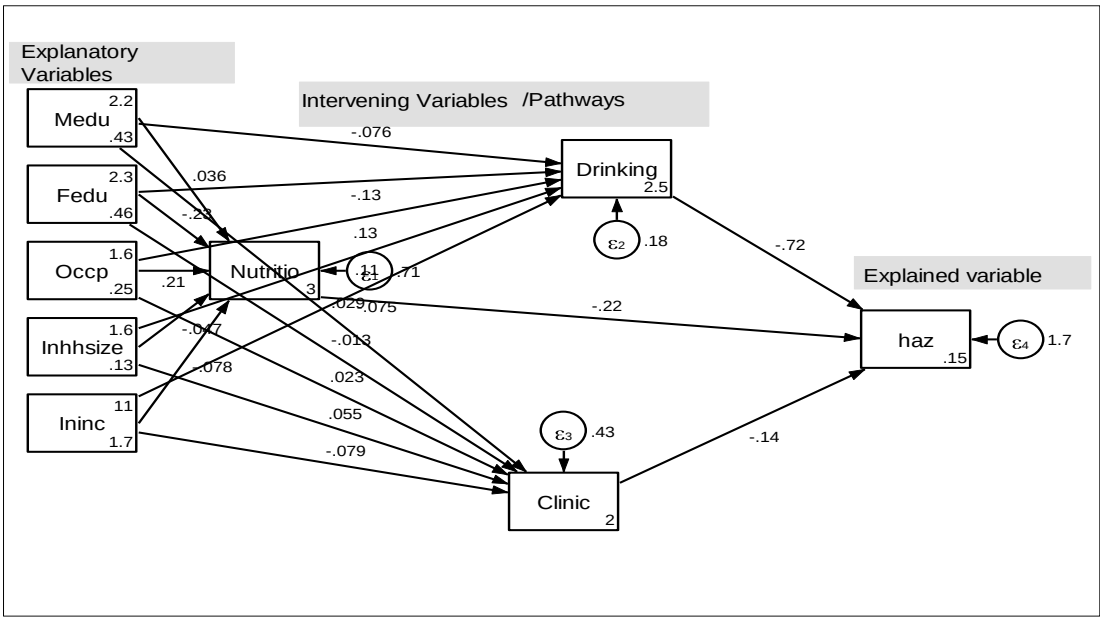

Figure 5.1 showing relationship between household socioeconomic variables, intervening variables (pathways) and child nutritional status-HAZ

Source: Research findings (2019)

Inconsistent with Aslam and Kingdo (2010); Huang and Azeze (2014); Maiga (2015) maternal education was found to have insignificant relationship with the selected channels. The insignificant of mother education would be due to few included intervening variables which do not provide the direct linkage.

5.5 Socioeconomic status and rural-urban gap in child health

Rural-urban gap in child health has been widely linked by the existing variation of socioeconomic factors between the rural and urban residences. The gap is more likely to be high depending on the extent that two residences vary in terms of socioeconomic status among households. The results from this study indicate that rural-urban gap in child nutritional status is -0.68 z-scores unit in Kagera region, as it is observed in table 4.6, and table 4.8 the gap in predicted probability of excellent child health among the two residences was found to be 0.12 points. Interestingly, yet still the obtained results are more plausible for urban children than rural children. That is predicted probability value among residences which is 0.55 points in urban residence and also 0.43 points in rural residence.

The same results on urban children having more average nutritional status are observed from the studies done by Fang *et al.* (2013); Liu *et al*. (2016); Mukong and Burns (2017). The big difference between results obtained from these studies is the size of the gap which was found to exist in all studies. Example Fang *et al.* (2013); who were concerned with the rural-urban child health gap in China identified -0.62 z-score units as the existing gap, and it was declining by years. Unlike to Mukong & Burns (2017) who studied the same study in Tanzania identified the existence of 0.45 z-scores units. The variation of the gaps in all studies might have been attributed by the nature of the data used; number of the sample included in the analysis and also the extent in which the studied residences vary in level of socioeconomic status could be the great cause of the variation. Tracing back to the theory of fundamental cause which stress that an area endowed with socio-economic resources automatically consist of best healthcare facilities and other basic facilities are located in such a way that it easy for the people residing in that area to access easily the available health services. However, allocation of health facilities in urban residences in Kagera region

is much better than rural residence and this might have driven for the observed variation.

In table 4.6 the rural-urban gap is divided into explained and unexplained portions when the Oaxaca-Blinder decomposition is involved in the analysis. Explained part of 0.49 (72 per cent of the total gap) z-score unit of the gap involves the observed characteristics which have been included in the model, these are differences in outcome resulted from the variation in values of independent variables (Bielby *et al*., 2014). The unexplained portion of 0.19 z-score (28 per cent of the gap) is due to unobserved components that were not included in the model. Unexplained variation are resulted from difference from the estimated coefficients, Blinder (1973) and Oaxaca (1973) emphasize that the existence of unexplained part is due to the discrimination since living in the non-discriminating world, it is obvious that individual with equal characteristics let say gender or age should have equal outcomes regardless of their gender or residence they live in. That is to say children in both residences would have made equal if variation in discrimination of characteristics due to the residence they live in would have vanished by 28 per cent in case of nutritional status and 25 per cent in reported health.

In table 4.7 it can be observed that household income, nutrition intake and drinking boiled water are significant and thus they all contribute to the explained gap. This shows that 36 per cent of the explained gap in nutrition is accounted by the difference in household income between rural and urban households, and also drinking boiled water accounts for about 33 per cent of overall explained rural-urban gap, limited nutrition intake among children accounts for 2 per cent. This finding is consistent with findings of past studies by Mukong and Burns (2017), which revealed that more than half of the explained gap was contributed by differences in socioeconomic status between households of the two residences.

Inconsistent with Van de Poel, Van Doorslaer and O'donnell (2009); Amirian *et al*. (2014); Mukong and Burns (2017) parental education especially mother education was found to statistical insignificant in contributing to the explained portion. Parental education was considered to be one of the factors that are likely to define variation of

child health, given that presence of formal education systems in towns; parents are likely to access education which would enable them to develop health behavior to facilitate their child health unlike to rural areas where there is limited access to formal education systems. This is also contrary to theory of fundamental cause which posits a person who uses educational credentials inherits a package deal that is more likely to include excellent health benefits.

Chronic illness such as prolonged diarrhea and also gender of a child were expected to have the effect on the variation of child health between the two residences but they were insignificant at all levels and this is inconsistent with Amirian *et al*. (2014). It was expected chronic illness to have the association with rural-urban gap since the overall hygiene and easy access to health facilities vary between rural and urban children.

In table 4.8 explained rural-urban gap in reported health is contributed by Mother primary education and nutrition intake. Mother with primary education contributes to about 16 per cent to the explained gap; children with access to nutrition intake contribute to about 33 per cent, and also with no access to nutrition intake account for 25 per cent of the explained gap. These findings are in line with the findings obtained by Khaoya (2015), who insisted that disparities in health among households is mostly driven by socioeconomic level disparity among parents which affect health through nutrition channel, and it favors the urban residence, and it is also in support with the fundamental theory which portray that education to be a link of reported excellent health.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

6.1 Introduction

This chapter provides the summary of the study findings as well as concluding remark. It also suggests policy implications based on the findings obtained from the study. Area of further study is suggested as well as a way of filling up the gaps which study was not able to explore.

6.2 Summary of the Study Findings

Tanzania Development vision 2025, HSSP IV and One plan II are among the current strategic direction guiding the implementation of health sector intervention in Tanzania. Tanzania Development vision 2025 outlines the several strategies to be achieved by 2025, among these strategies includes access to quality primary health care for all and also food self-sufficiency and food security. HSSP IV targets to reach all households with essential health and social welfare services that is by meeting the expectations of the population. This strategy is adhered to improvement of socioeconomic strategies among households. One Plan II takes into account the emphasis enshrined within Sustainable Development Goals (SDGs) and other international strategies. One strategy under its goal considers child health improvement. Through these interventions the government has been able to implement high-impact health programmes such as routine immunization, improved management of common childhood illnesses and reduced child mortality, though a challenge still persist on issues pertaining on child health disparities among regions throughout the country.

This study was designed to examine the effects of household socioeconomic status on rural-urban child health disparities in Kagera region. Initially, the study assessed the effects of socioeconomic status on nutritional status using height-for-age Z-scores and child self-reported health as outcomes, and then existing relationship between household socioeconomic indicators and selected intervening variables was examined, and finally rural-urban gap in child health was estimated. The study used individual level data from field survey which was conducted in January 2019 to

February 2019 in Kagera region, specifically Bukoba Urban and Bukoba rural. To examine rural-urban child health disparity, the study used the sample of 308 households who had children aging 24-59 months.

The first objective of this study was to assess the effect of household socioeconomic status on child nutritional status using height-for-age Z-score as an outcome. To analyze the effects of socioeconomic status, Ordinary Least Square (OLS) was used and Instrumental variable approach used to confirm endogeneity problem. The explanatory variables used were child gender, residence, both father and mother education, occupation, illness, clinic visit, nutrition intake, drinking boiled water, household size, and household income.

The regression results in all residences show that father education, household income, coughing/flu infection, nutrition intake, drinking boiled water, and gender of a child were the variables that were significant at different levels. In urban residence only mother education, clinic visits, nutrition intake, drinking boiled water, and gender of a child were significant at different levels. In rural residence; father education, coughing/flu infection, drinking boiled water, child age group, and gender of a child were only significant. The results obtained from the probit model explain the effect of household socioeconomic status on child health using stunted growth as a dependent variable. The model was used as to ensure that results obtained from using OLS are not due to the model chosen. Variables such as area of residence, father primary education, nutrition intake, household income, gender of a child, child age group were found to be statistically significant. Results obtained in all models give similar results despite the variation that occurs in the interpretation, it can therefore be confirmed that results in all models are not driven by the nature of the model used.

The second objective sought to assess the effect of household socioeconomic status on self reported health. SRH was examined by asking the respondents on how they would describe their children health in relation to the children of their age. Four main categories of SRH were expected to be obtained from the respondents, these are excellent health, good, fair, and poor health; ordered probit model was employed.

The results obtained from the regression show that difficulty in chronic illness, household income, access to boiled water, nutrition intake, and mother education were statistically significant at different levels in all residences. In the regression that includes all residences nutrition intake and difficulty in chronic illness appear to be significant at 5 per cent. In urban residence, log of income, mother education, nutrition intake, drinking boiled water and difficulty in chronic illness were significant at 5 per cent. The insignificant of socioeconomic variables in rural residence might have been contributed by measurement errors which is associated with misreporting by the respondents studied, and involvement of few pathways that household socioeconomic status influence reported health in Bukoba rural, might have been influenced the insignificance of variables.

The third objective intended to examine the relationship between household socioeconomic indicators, pathways/channels and child health. Nutrition intake, clinic visit and drinking boiled were the selected pathways and are confirmed to be related with the included household socioeconomic indicators. Occupation, father education and household income have been found to affect health inputs mostly in all residences. Though, occupation indicator has more effect of about 20 per cent average on the identified channels compared to other socioeconomic indicators, and the relationship is more on nutrition intake and drinking boiled water.

The fourth objective sought to estimate rural-urban gap in child health using HAZ and SRH as an outcomes. To quantify the existing gap in child health between rural and urban residences twofold Blinder-Oaxaca decomposition and Fairlie non-linear decomposition technique were used. The twofold Blinder-Oaxaca decomposition was used to estimate the gap using HAZ as an outcome, and also Fairlie non-linear decomposition technique was used to estimate the gap in SRH between the two residences. Fairlie non-linear decomposition accepts the binary outcome variable, and thus SRH was dichotomized into a binary outcome; as to be in line with other studies, excellent health/good health were recoded as 1 value and fair/poor health were recoded as 0 value. In estimating HAZ, the results suggest that both observed and unobserved components were significant at 1 per cent and 10 per cent

respectively. Further the table shows that children from rural residence had lower height-for-age z-scores compared to children from urban residence. More specifically, the estimated height-for-age z-scores average was -1.89 in rural residence and -1.20 in urban residence, in which this gives the total difference (gap) of -0.68 z-scores unit, the observed (explained) variables in the model can explain 72 per cent of the total gap; the other 28 per cent can be explained unobserved components (unexplained). The results from nonlinear decomposition (using Probit model) show that the total rural-urban gap in predicted probability of having excellent child self reported health is 0.12 points, this gap is obtained from the difference of predicted probability value among residences which is 0.55 points in urban residence and also 0.43 points in rural residence. The variables included in the model explain about 75 per cent of the total rural-urban gap and the remaining portion of about 25 per cent is explained by unobserved variables.

Explanatory variables such as drinking boiled water, father with no education, and household income are significant at 5 per cent at explained portion, were therefore identified as the contributor to the estimated explained gap in nutritional status between rural and urban children. The gap existing in SRH was contributed by mother's primary education and nutrition intake which were significant at 5 per cent.

6.3 Conclusion of the Study

Rural-urban gap is still a problem and it is prevailing at a large magnitude, as it evidenced from Kagera region**.** From the findings of the study, it can be generalized that household income, parental education are the key household socioeconomic determinants of child health in the studied area. In particular, the highlighted variables influence child health through several channels of which among these have been found to be significant at different levels. These channels include nutrition intake behaviour, drinking boiled water, and clinic visit. Also the observed channels have a significant relationship with selected household socioeconomic indicators. Likewise to the estimated rural-urban child health gap, household income and parental education were identified as the variables that alter the existing rural-urban child health gap in Kagera region. The highlighted variables have been found to be

consistent with several studies identified in the preceding chapter as well as theories employed in the study. The estimated gap was found to be more plausible to the urban residence as urban children had the difference of -0.68 z-scores in HAZ and predicted probability in SRH was 0.12 points, that is rural children in Kagera region if were to be made equivalent in health with urban children, then the gap in HAZ would be vanished by -0.68 z-scores. Likewise to SRH, its gap would be required to vanish by 0.12 points in predicted probability.

Tanzania Development vision 2025, HSSP IV and One plan II are identified to be among the current outlined strategic directions in the health sector interventions as it has been explained in the summary section. However, if these interventions are implemented at a high percent, it is obvious that improvement in household socioeconomic status and child health outcomes will be improved in all residences in the country. Provided that the study has witnessed the existence of disparity in child health among studied residences, implementation of the interventions should consider the existence of this disparity and favours the rural residences.

6.4 Contribution to Knowledge

The study contributes knowledge to the existing literature by assessing and estimating rural-urban child health disparity using more than one indicator of child health status. Globally, persistence of rural-urban disparity in child health is evident. The study therefore creates awareness on the needful of assessing child health using several measures, as the use of few child health indicators may underestimate the child health status in a developing country consisting of multiple packages of health challenges, thereby misleading the health intervention and programmes directed to the improvement of child health.

6.5 Policy Implications

Here below are the outlined recommendations which are categorized into recommendation for policy implication and those for further research.

6.5.1 Recommendations for Possible Policy Implications

With the evidence from the obtained findings, the study highlights the following policy implications which can be probably used in addressing rural-urban disparity in the studied area and Tanzania at large:

Firstly, strengthening Unconditional Cash transfer programme such as TASAF should be the major focus of intervention especially in rural residence in order to tackle child health disparity. The unconditional social funds are expected to have greater impacts on poor population through increased consumption of basic food items and meeting additional health care among children. There is still a debate on the whether the provided cash transfer is used in a directive way, however strengthening unconditional cash transfer has to go with regulation which guides the beneficial group.

Secondly, the study findings have confirmed parental education to influence child health outcomes. Investing in education especially female education would reduce the observed child health gap. Confirmation of the usefulness of parental education especially maternal education on child health outcomes has long been proposed, and this calls for policies that promote maternal education and empower women. Empowerment of women will obviously enhance the use of modern health services and improve health outcomes, thereby lowering child health disparity among regions.

6.5.2 Recommendations for Further Research

Firstly, the current literatures are widely focusing on decomposing child health gap using panel data as to assess the trend of the gap. The existing literature in Tanzania on child health gap have focused on one way decomposition which uses cross sectional data, but it does not account for the trends of the gap itself and its socioeconomic factors contribution over years. The future research would focus on tracing the trends of the gap and its contributing socioeconomic variables. Examining trends in child health disparity, its contribution factors and also using different health indicators can be used as a benchmark for policy makers to identify the relevant reforms to be undertaken as to reduce the child health disparity.

Secondly, this study has identified household income and parental education to be the key variables that influence rural-urban child health outcomes. The identified socioeconomic variables have been studied to influence child health through several channels/pathways, and nutrition intake behaviour, drinking boiled water and clinic visit have been highlighted in this study to be among the channels that socioeconomic status influence child health. The study would recommend further exploration on the other household socioeconomic variables and relevant channels that affect the child health outcomes. Transmission channels might differ with residence such that a child in rural residence might experience stunting because of limited affordability of balance diet, whereas a child from urban residence might be having obesity just because high amount of food is purchased but still yet the purchased food is unhealthy food, the same scenario can be considered when evaluating self reported child health in both residences.

6.6 Limitations of the Study

The study considers the data relating to SRH to be the key limitation. Parents had to assess their children health basing on the categories involved in assessing SRH; sometime it required parents to reveal the severity of their children disease. This therefore might have an influence on measurement errors since subgroups of the respondents involved different short response when reporting health.

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APPENDICES

APPENDIX 1: RESEARCH QUESTIONNAIRE

HOUSEHOLD SOCIO-ECONOMIC STATUS AND RURAL-URBAN CHILD HEALTH DISPARITY IN KAGERA REGION: THE CASE OF CHILDREN UNDER FIVE YEARS

Dear respondent,

I am Enock Mujuni Kamala, a student at Mzumbe University in Morogoro, Tanzania. I am conducting a research on household socio-economic status and rural-urban child health disparity in Kagera region. You are among the people who have been selected to participate in this study to obtain your contribution, perceptions and views regarding various issues on child health of children under the age of five years. The purpose of this study and its findings is purely academic thus, I kindly request for your assistance and cooperation by sparing some of your time to participate in this study. All information provided will be handled and treated with utmost confidentiality.

Thank You in advance.

GENERAL INFORMATION

District:…….....….....

Ward:……..... Village.....

Sex of the Respondent: Male [ ] Female [ ]

Household size.....Number of children..... (24-59 months)

Child Gender: Male [ ] Female [ ]

SECTION A: DEMOGRAPHIC INFORMATION

- ✓ **Tick where appropriate**

A-1: Demographic information

1. Do you have a child (children) below age of five in your house?

a. Yes [ ] b. No [ ]

2. If yes, what is this child's CURRENT age?.....
3. If yes, what is this child's CURRENT height?

[…….] centimeter […….] inches

4. How much does this child CURRENTLY weigh?

[……] kilogram […….] grams

5. Do you live with your partner?

a. Yes [ ] b. No [ ]

6. If no, which one among these is the reason of not living with your partner (marital status)?

a. Separated [ ] b. Divorced [ ] c. Widowed [ ]

SECTION B: SOCIOECONOMIC INFORMATION

B-1: Education

7. What is your (mother) education level?

a. Uneducated [ ] b. Primary level ( ) c. Secondary level ( ) d. College/university ( )

8. What is your (father) education level?

a. Uneducated ( ) b. Primary level ( ) c. Secondary level ( ) d. College/university ( )

B-2: Occupation

9. What is your current occupation?

…….

B-3: Income

10. What is your total combined monthly family income?

……

C: SELF-REPORTED HEALTH (SRH) INFORMATION

11. How would you describe your child general health in relation to children of his/her age?
    a. Excellent [ ] b. Good [ ] c. Fair [ ]
    d. Poor [ ]

12. DURING THE PAST 2 WEEKS, did this child had FREQUENT or CHRONIC difficulty with any of the following?

a. Diarrhorea [ ] b. Fever [ ]

c. Acute Respiratory Infections (Coughing/flu) [ ] d. Non Illness [ ]

D: HEALTH LERATED BEHAVIOUR

D-1: Clinic Visit

13. Does this child access full healthcare as scheduled at a clinic center?
    a. Yes [……...] b. No [……] c. Rarely [……]

D-2 Nutrition Intake

14. Did you feed this child nutritious animal sources food products or fish in the last two weeks?

a. Yes […….] b. No […….] c. Rarely [……]

D-3 Drinking boiled water

15. Do you boil drinking water regularly?

a. Yes [……] b. No [……]

APPENDIX 2: DESCRIPTIVE STATISTICS BETWEEN TWO RESIDENCES

Table B.1: Summary of Descriptive statistics between two residences

Variables	Rural Residence			Urban Residence		
	Mean	Min	Max	Mean	Min	Max
Child Characteristics						
Gender of a Child	1.560606	1	2	1.536364	1	2
Height for age z-score	-1.88606	-6.1	2.19	-1.20009	-4.9	1.97
child height in cm	89.60354	71.8	107.4	91.88182	72.1	111
Child Age in months	38.5	23	58	37.88182	24	56
Household Socio-economic characteristics						
Household size	5.757576	2	12	4.809091	2	12
Mother education	2.010101	1	4	2.454545	1	4
Father education	2.075758	1	4	2.618182	1	4
Occupation	1.777778	1	2	1.181818	1	2
Household income	71772.73	2000	600000	196409.1	5000	1500000
child health related characteristics						
Child Self Reported Health	2.449495	1	4	2.1	1	4
Difficulty in respiratory infection	2.914141	1	4	2.963636	1	4
Clinic Visits	1.313131	1	3	1.281818	1	3
Nutrition Intake	2.025253	1	3	1.772727	1	3
Drinking boiled water	1.767677	1	2	1.427273	1	2
Number of Observations	198	198	198	110	110	110

Table B.2: Summary statistics on residence, Child self reported health (SRH) and Stunting (HAZ)

SRH				HAZ			
	Rural	Urban	Total		Rural	Urban	Total
Excellent	24	31	55	1 (If stunted)	91	24	115
Good	63	34	97				
fair	51	26	77	0 (Not stunted)	107	86	193
Poor	60	19	79				

APPENDIX 3: INSTRUMENTAL VARIABLE APPROACH

Table C.1: Instrumental Variable Approach

variables	**Both residences**		**Urban residence**		**Rural residence**	
HAZ	Coef.	P>z	Coef.	P>z	Coef.	P>z
Log of income	0.12207	0.476	-0.0452	0.886	0.09389	0.647
Gender of a child						
Female	0.41611	0.004	0.39175	0.076	0.42150	0.024
Log of household size	-0.00781	0.969	0.27774	0.416	0.01964	0.941
Drinking boiled water						
No	-0.45225	0.018	-0.44847	0.139	-0.4966	0.048
Household Occupation						
Farmers	0.07480	0.722	0.17093	0.569	0.26521	0.322
Clinic Visits						
No	-0.18966	0.527	-0.13106	0.814	-0.2919	0.407
Rarely	-0.3595	0.114	-0.55982	0.113	-0.2522	0.391
Nutrition Intake						
No	-0.78044	0.000	-1.75464	0.000	-0.4301	0.088
Rarely	-0.34322	0.053	-0.71961	0.013	-0.1249	0.602
Chronic Illiness						
Fever	-0.05711	0.838	-0.14968	0.731	0.00025	0.999
Coughing/flu infections	-0.35197	0.121	-0.16585	0.617	-0.4112	0.172
None	0.141453	0.564	0.705602	0.086	-0.0631	0.84
R-squared	0.2153		0.3535		0.1148	
Number of observation	308		110		198	

Table C.2: Probit Model Results on Stunting

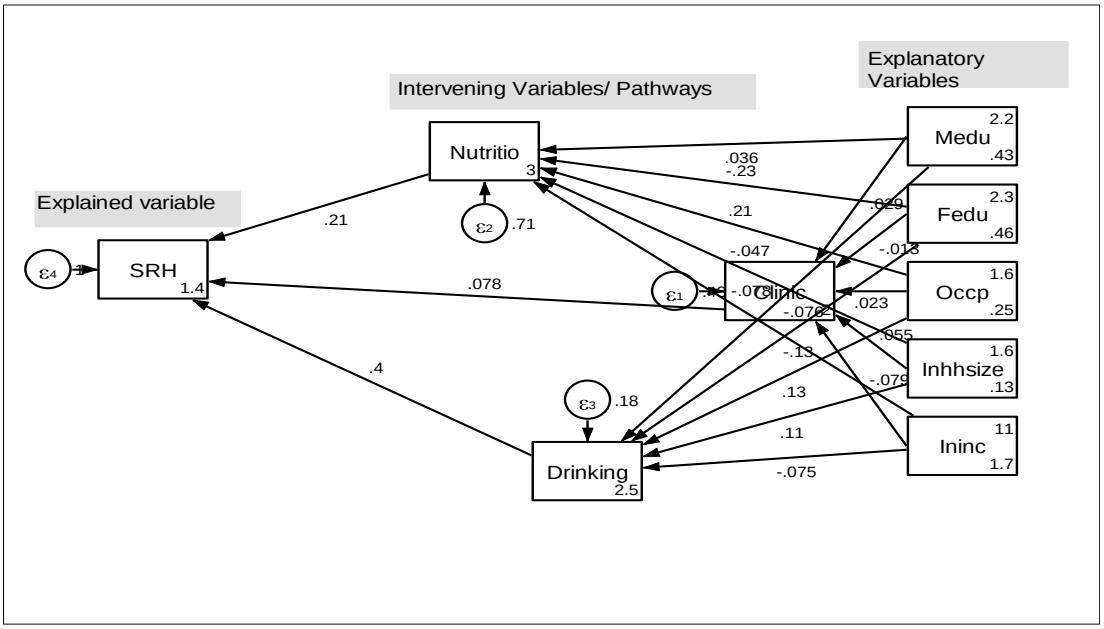
HAZ	Marginal effect	Std. Err.	z	P-value
Mother with no education	-0.2370588	0.13845	-1.71	0.087
Mother's primary education	-0.2519673	0.20887	-1.21	0.228
Mother's secondary education	-0.0647237	0.19612	-0.33	0.741
Father's with no education	-0.0387576	0.19023	-0.2	0.839
Father's primary education	-0.3347082	0.16863	-1.98	0.047
Father's secondary education	-0.2171229	0.12966	-1.67	0.094
parental occupation	-0.0176393	0.07643	-0.23	0.817
diarrhoea illness	-0.0207671	0.0968	-0.21	0.83
fever illness	-0.0069817	0.09876	-0.07	0.944
coughing/flu infection	0.1028574	0.07486	1.37	0.169
Clinic visits (Yes)	-0.1505379	0.10203	-1.48	0.14
Clinic visits (No)	-0.0914191	0.12492	-0.73	0.464
Nutrition intake (Yes)	-0.1608254	0.07078	-2.27	0.023
Nutrition intake (No)	0.1783306	0.08558	2.08	0.037
Drinking boiled water	-0.0620536	0.07428	-0.84	0.404
child age group (24-36 months)	0.2285191	0.06018	3.8	0
Gender of a child (male)	0.1451011	0.06169	2.35	0.019
residence (rural)	0.1970038	0.0768	2.57	0.01
household Income	-0.1216851	0.04217	-2.89	0.004
log of child number in the house	0.0902581	0.10265	0.88	0.379
log of household size	0.0096902	0.08828	0.11	0.913
Marginal effect prediction	0.32			
Number of observation	308			

APPENDIX 4: STRUCTURAL EQUATION MODELING

Table D.1: Linkage between household socioeconomic variables, intervening variables (pathways) and child health outcomes

	HAZ		SRH	
	Coefficient	P-values	Coefficient	P-values
All Residences				
Nutrition Intake	-0.2206697	0.015	0.2111557	0.003
Clinic Vists	-0.1354521	0.234	0.3990584	0.002
Drinking Boiled water	-0.7234631	0	0.0781744	0.375
URBAN				
Nutrition Intake	-0.4124953	0.002	0.2169109	0.053
Clinic Vists	-0.2968985	0.11	0.3258766	0.038
Drinking Boiled water	-0.5131863	0.046	-0.1339694	0.538
RURAL				
Nutrition Intake	-0.0830599	0.485	0.1297659	0.209
Clinic Vists	-0.0823098	0.558	-0.0959978	0.431
Drinking Boiled water	-0.6036389	0.01	0.367927	0.071

Figure D.1: Relationship between household socioeconomic variables, intervening variables (pathways) and SRH



APPENDIX 5: DECOMPOSITION TECHNIQUE

Decomposition technique commands in STATA

Relevant commands file package need to be installed in STATA software.

a) *Oaxaca* dependent variable independent variables, by (group to be decomposed) omega/pooled/threefold

b) *nldecompo*se, by (group to be decomposed) pooled/threefold: non-linear model (probit/ordered/logit etc) dependent variable independent variables

c) fairlie dependent variable independent variables, by (group to be decomposed)

Table E.2: Decomposition technique results

Blinder-Oaxaca decomposition	Number of obs	=	308
	Model	=	linear
Group 1: residenc = 1	N of obs 1	=	198
Group 2: residenc = 2	N of obs 2	=	110

haz	**Coef.**	**Robust Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
group_1	-1.886061	0.094586	-19.94	0.000	-2.071446	-1.70068
group_2	-1.200091	0.13083	-9.17	0.000	-1.456513	-0.94367
difference	-0.6859697	0.16144	-4.25	0.000	-1.002387	-0.36955
explained	-0.4913715	0.119128	-4.12	0.000	-0.7248577	-0.25789
unexplained	-0.1945982	0.115984	-1.68	0.093	-0.4219221	0.032726
explained						
Mothered1	0.003222	0.049165	0.07	0.948	-0.09314	0.099584
Mothered2	0.0178856	0.061796	0.29	0.772	-0.1032315	0.139003
Mothered3	0.0300742	0.086412	0.35	0.728	-0.1392901	0.199439
Fathered1	-0.0786151	0.039725	-1.98	0.048	-0.1564739	-0.00076
Fathered2	-0.0403621	0.078379	-0.51	0.607	-0.1939821	0.113258
Fathered3	0.0578109	0.070856	0.82	0.415	-0.0810646	0.196686
occupation1	0.0324998	0.092186	0.35	0.724	-0.1481812	0.213181
Difficulty1	0.0030243	0.008758	0.35	0.73	-0.0141413	0.02019
Difficulty2	-0.0069109	0.014959	-0.46	0.644	-0.0362293	0.022408
Difficulty3	-0.0235343	0.027815	-0.85	0.397	-0.0780498	0.030981
Clinic1	-0.0089346	0.014227	-0.63	0.53	-0.0368183	0.018949
Clinic2	0.0060671	0.013327	0.46	0.649	-0.0200526	0.032187
Nutrition1	-0.0692851	0.044287	-1.56	0.118	-0.1560867	0.017517
Nutrition2	-0.0992343	0.047858	-2.07	0.038	-0.1930336	-0.00544

Drinking1	-0.142283	0.057746	-2.46	0.014	-0.2554628	-0.0291
Ininc	-0.1814094	0.078321	-2.32	0.021	-0.3349166	-0.0279
Inhhsize	0.0086134	0.038061	0.23	0.821	-0.0659842	0.083211
unexplained						
Mothered1	-0.2645822	0.095504	-2.77	0.006	-0.451766	-0.0774
Mothered2	-0.6636692	0.361121	-1.84	0.066	-1.371454	0.044115
Mothered3	-0.1948789	0.122124	-1.6	0.111	-0.4342378	0.04448
Fathered1	0.0428981	0.06671	0.64	0.52	-0.0878504	0.173647
Fathered2	0.1189846	0.445573	0.27	0.789	-0.7543232	0.992292
Fathered3	0.0659826	0.137938	0.48	0.632	-0.2043713	0.336337
occupation1	0.0947462	0.242132	0.39	0.696	-0.3798243	0.569317
Difficulty1	0.1151779	0.063979	1.8	0.072	-0.010219	0.240575
Difficulty2	0.0300449	0.052216	0.58	0.565	-0.0722974	0.132387
Difficulty3	0.1119552	0.123738	0.9	0.366	-0.1305658	0.354476
Clinic1	-0.4068323	0.376539	-1.08	0.28	-1.144834	0.33117
Clinic2	-0.0354797	0.038146	-0.93	0.352	-0.1102446	0.039285
Nutrition1	-0.3009645	0.17219	-1.75	0.08	-0.6384499	0.036521
Nutrition2	0.0807087	0.069517	1.16	0.246	-0.0555413	0.216959
Drinking1	0.0299564	0.137415	0.22	0.827	-0.2393718	0.299285
Ininc	-1.286348	1.576445	-0.82	0.415	-4.376123	1.803427
Inhhsize	0.1956444	0.587994	0.33	0.739	-0.9568018	1.348091
_cons	2.072058	2.218851	0.93	0.35	-2.276811	6.420926