# UNIVERSITY OF GHANA
## LEGON


## College of Humanities

**HEALTH EXPENDITURE AND HEALTH OUTCOMES IN SUB-SAHARAN AFRICA: THE ROLE OF GOVERNANCE AND INSTITUTIONAL QUALITY**

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**DEPARTMENT OF ECONOMICS**

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# DECLARATION

I, ISAAC PONKU, hereby declare that this thesis "**HEALTH EXPENDITURE AND HEALTH OUTCOMES IN SUB-SAHARAN AFRICA: THE ROLE OF GOVERNANCE AND INSTITUTIONAL QUALITY"** is completely my own work except for the references used which have been duly cited. This work has not been presented either in part or whole for a degree at this University or elsewhere.

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(CO- SUPERVISOR)

# DEDICATION

This thesis is dedicated to my late parents, who had always expected me to be successful and climb to any level that God will allow me. I wish you were alive to steer the celebration; may you rest well in your graves.

# ACKNOWLEDGEMENT

I am most thankful to God for the many blessings throughout my study. Again, I extend a heartfelt appreciation to the Department of Economics, University of Ghana, Legon for the opportunity to pursue a master's degree in economics and expanding my knowledge in this field.

My warmest appreciation goes to my supervisors, Prof. Edward Nketiah-Amponsah and Prof. Bernardin Senadza, for their compassionate support and exciting questions that helped shape the course of this thesis. I have always admired your hard work, discipline and gentle spirit. I am very thankful for the mentorship given me.

To all my siblings for the love and support they have shown throughout my education and my friends and relatives who encouraged me in diverse forms.

## Abstract

The effect of both private and public health expenditures on health outcomes has received much attention in the literature. However, how governance and institutional quality mediate between these health expenditures and health outcomes have attracted limited attention as far as Sub-Saharan Africa (SSA) is concerned, thus, necessitating this study.

This study used the system generalized method of moment estimation technique. It covered 22 Sub-Saharan Africa countries with data spanning from 2000 to 2015. Health outcomes used in the study are infant mortality, under-five mortality and life expectancy at birth. The results from the study show that governance and institutional quality significantly enhance the effect of both private and public health expenditures in achieving better health outcomes. Precisely, holding health expenditures constant, quality institutions will aid in public health expenditure reducing infant mortality by 2.8 per 1,000 live births and improve life expectancy by 0.03 years. Likewise, quality institutions will mediate private health expenditure to reduce infant mortality by 1.6 per 1,000 live births and increase life expectancy by 0.04 years. Although effective governance is significant in mediating public health expenditure to ensure reduced under-five mortality, the mediating role of effective governance on private health expenditure is not significant in achieving better health outcomes. Other variables that are statistically significant in promoting good health are nourishment and access to good sanitation facilities.

It is therefore important for countries within SSA to empower their institutions with the needed tools and legislation to enable them perform their functions to their full capacity and as well provide the mechanism for assessing the performance of the institutions to ensure that health outcomes are enhanced.

# TABLE OF CONTENTS

**CONTENT** **PAGE**

# LIST OF TABLES

**TABLE** **PAGE**

# LIST OF FIGURES

**FIGURE** **PAGE**

# LIST OF ABBREVIATIONS

| | |
|---|---|
| 2SLS | Two-Stage Least Square |
| ADF | Augmented Dickey-Fuller |
| BMI | Body Mass Index |
| FE | Fixed Effect |
| GDP | Gross Domestic Product |
| GMM | Generalized Method of Moment |
| HO | Health Outcome |
| ICRG | International Country Risk Guide |
| IMR | Infant Mortality Rate |
| LE | Life Expectancy |
| MMR | Maternal Mortality Rate |
| OLS | Ordinary Least Square |
| PPP | Purchasing Power Parity |
| QALY | Quality Adjusted Life Years |
| SSA | Sub-Saharan Africa |
| U5MR | Under-five Mortality Rate |
| UHC | Universal Health Coverage |
| WDI | World Development Indicators |
| WHO | World Health Organization |

# CHAPTER ONE

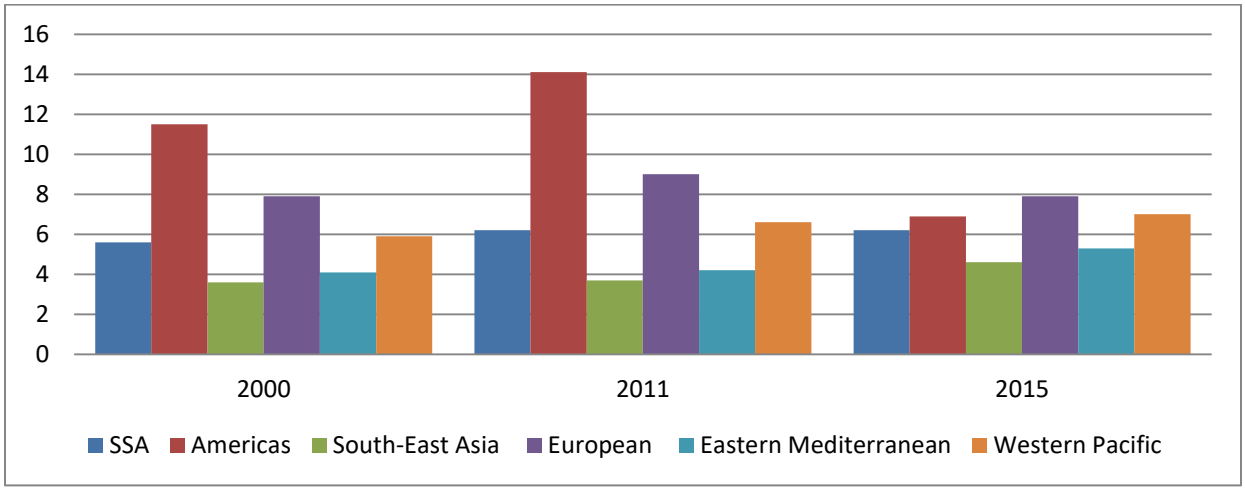
# INTRODUCTION

## 1.1 Background

The importance of health to development is well-grounded in the literature (Aloka, 2015). As a result, both the government and the citizenry make part of their incomes available to finance their health (both preventive and curative) to enhance their income levels (Grossman, 1972). This has resulted in several works by authors such as Arthur and Oaikhenan (2017), Nketiah-Amponsah (2019) and Rajkumar and Swaroop (2008) which aimed at finding out how public and private health outlays affect health indicators measured by the infant, neonatal, under-five, maternal mortality and life expectancy.

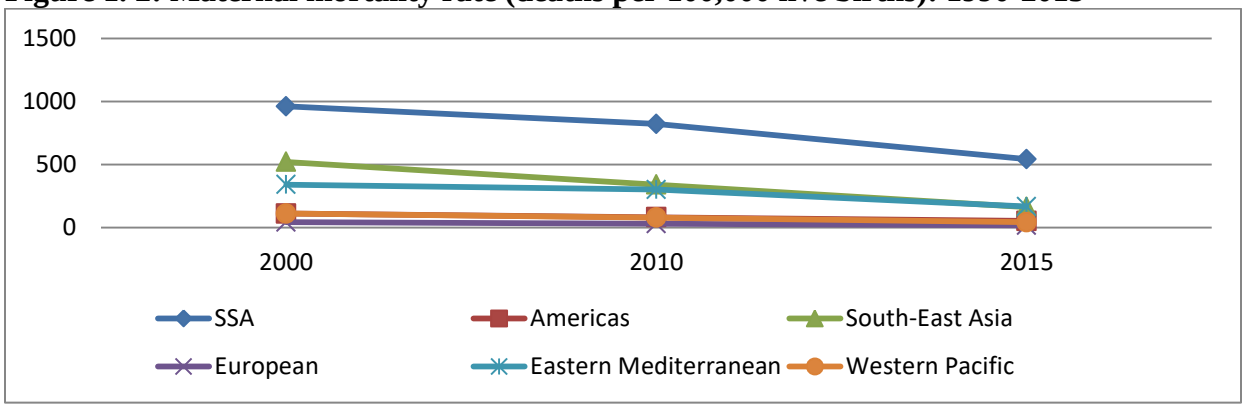
In particular, the finding from the link between public health spending and health indicators in recent years has influenced all countries, especially in SSA to increase their health expenditures to realize the gains in health outcomes. For instance, the health outlay per capita, in PPP terms (constant 2005 international dollar) improved from $72.22 to $147 from 2000 to 2010. Remarkably, the benefits from these expenditure increases are not at par and below their potential gains compared with the rate of increase in health spending and the associated outcomes of other regions of the world. As at 2015, maternal mortality rates in SSA was 542 (per 100,000 live births) whiles health expenditure in SSA has been greater than other regions such as South-Eastern Asia and Eastern Mediterranean, though they have had health outcomes better than SSA especially maternal deaths (see Figures 1.1 and 1.2).

**Figure 1. 1: Global health expenditure as a percentage of GDP for the years 2000, 2011 and 2015**




Source: World Health Statistics, 2014; 2018

**Figure 1. 2: Maternal mortality rate (deaths per 100,000 live births): 1990-2015**




Source: World Health Statistics, 2014; 2018

It is interesting to find from Figures 1.1 and 1.2 that SSA spends more of its income on health than Eastern Mediterranean and South-Eastern Asia but health outcomes in SSA are not comparable to the two regions. But these health expenditures are made due to the acknowledged relevance of improving human capital in the literature. It is for these reasons that the governments in SSA make available portions of their incomes to finance health. The importance of health expenditure is to ensure improvement in human capital development since it is a crucial reagent to economic growth and development at both micro and macro levels (Novignon &

Lawanson, 2017; Wilson & Briscoe, 2004). The neoclassical endogenous development model hypothesizes that development in human capital significantly affects the output per worker in the long run. Likewise, as proposed by Grossman's human capital model, quality health profoundly impacts human capital growth via the extra working time and satisfaction obtained from upright health. Thus, upright health not only increase persons' consumption and production in the immediate term but increases yields to investments in productive undertakings beyond the immediate run.

Given the acknowledged importance of health spending on health indicators in the literature in an economy for which reason countries within SSA make the continuing effort of increasing their health expenditure, how come the benefit is not felt as far as SSA is concerned? Could it be as a result of inefficiencies in the form of waste and leakages in spending? Interestingly, how governance and institutional setups in SSA mediate between health expenditure in influencing health outcomes has received little or no attention in the region. The role of the governance system in an economy's development cannot be debated. More clearly, it is the governance system in an economy that provides the platform for all social interactions to thrive by establishing the form of institutions that are predictable, impartial and consistently enforcing the set of rules for all actors of the economy (Novotná, Šánová, & Laputková, 2016). For example, Navarro et al. (2006) state that the political ideologies of a ruling political party in any country influence the rates of infant mortality and life expectancies in those countries; as well, the government's policies that are aimed at reducing social inequalities have a beneficial impact on the populace.

Thus, the quality of governance is largely determined by the quality of public policymaking and delivery as well as the extent to which decision-making and implementation of the policy are

conducted in a transparent, efficient and impartial manner (Rothstein & Teorell, 2008). Likewise, Holmberg, Rothstein, and Nasiritousi (2009) state that the well-being of people in any economy is linked with the quality of the governance system ensuing in that jurisdiction. This is also enforced by Novotná et al. (2016), that the quality of a country's governance system affects all market operations and investments including health.

When these health expenditures are made (either private or public), they do not operate in a vacuum, rather, they are largely dependent on the existing institutions entrusted with the responsibility of managing the funds. In like manner, the efficacious operations of the institutions by and large depend on the political atmosphere in the country. This presents the need to evaluate how health expenditures could yield their benefit if the governance and institutional setups are effective.

### 1.2 Research problem

In recent years, the importance of both public and private health expenditure is increasingly gaining momentum as a predictor of health outcomes measured by indicators such as infant mortality, under-five mortality, maternal mortality rates and life expectancy. This has resulted in several countries in SSA increasing their health expenditures to that effect to realize the benefit thereof, although the rate of increase in their health expenditure is below expectations. Although the region is making progress with regard to increasing her health spending, Rajkumar and Swaroop (2008) state that health expenditures achieve their objective only in nations where good governance with appropriate bureaucratic practices and truncated level of bribery are present. That is, health outcomes are not improved with only health spending. Rather, governance tools

comprising of well-functioning budget preparation, execution, and monitoring are necessary to ensure better health status. Wagstaff and Cleason (2004) also reiterate that the degree to which civic health care expenditure promotes health indicators is highly dependent on the efficacy of policies and institutions. Yet, in spite of the existence several studies on health expenditure and health outcomes in SSA, hardly have these studies examined the role of governance and institutional effectiveness in influencing health outcomes. The present study makes a modest contribution to the health expenditure and outcomes literature by examining the role of governance and institutional quality in influencing health outcomes.

This study, therefore, seeks to investigate how governance and institutions in SSA could help in materializing the benefits of increasing both public and private health expenditures in the region.

### 1.3 Objectives of the study

The study seeks to:

i. Examine the effect of health expenditure on health outcomes
ii. Examine the effect of governance and institutional quality on health outcomes
iii. Examine how governance and institutional quality mediate health expenditure on health outcomes

### 1.4 The relevance of the study

Given the critical role of governance and good institutions in achieving better health, few studies have focused on determining the impact of governance and institutions in achieving health

outcomes as far as SSA is concerned. Out of the handful of studies that have aggregated the role of governance in attaining health outcomes in SSA, all the studies used panel fixed and random effect estimation methods in achieving this purpose.

This study, therefore, seeks to contribute to the literature on the subject by using the generalized method of moment (GMM) estimation procedure to determine whether the results from the GMM estimate will be different from the fixed and random effect techniques presented by earlier authors. Again, the findings from this study will enable policy makers realize the importance of governance and quality institutions in mediating between private and public health expenditures to achieve better health outcomes.

### 1.5 Structure of the study

The structured of the study is as follows; Chapter One covers the background of the study, research problem, objectives of the study and the relevance of the study. In Chapter Two, the general healthcare situation in Africa is presented and Chapter Three contains both theoretical and empirical reviews of the literature. Chapters Four and Five comprise the methodology and empirical analysis respectively while Chapter Six contains summary, policy recommendations and conclusion.

# CHAPTER TWO

# HEALTH EXPENDITURE AND HEALTH OUTCOMES SSA

## 2.1 Introduction

This chapter will consist of three sections. Section 2.2 presents the general health expenditure trends in SSA between the years 2000 and 2015. Section 2.3 looks at health outcomes in the region. We then summarize the chapter with section 3.4.

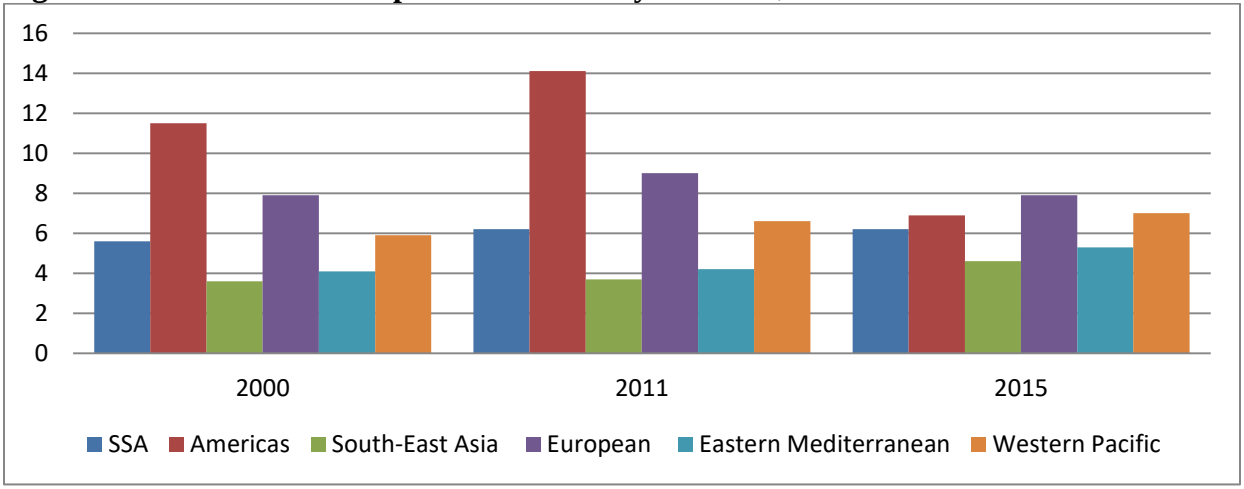
## 2.2 Health Expenditure Trends in SSA (2000 – 2015)

The growing concern for universal health coverage (UHC) has made health expenditure very critical across the globe. This comes as a result of the known association between health expenditure and outcomes in the literature. To improve health, most countries embark on the provision of health facilities, acquisition of needed drugs and training of health personnel. Though countries make available the needed materials for health delivery, it is important to note that the availability as well as the quality of these services and facilities, eventually determines the quality of health in a country. This makes health expenditure very crucial in improving a nation's health status due to its several functions. Hence, health expenditure does not only cover the provision of preventive and curative services but as well includes nutrition activities, family planning activities and emergency aid designated for health (World Bank, 2012).

For the past decades, all regions across the world have seen an increase in health expenditure (see Figure 2.1). The World Bank's 2012 report shows that the world’s total health expenditure per capita, PPP (constant 2005 international $) increased from $453.98 in 1995 to $783.17 in

2005 and further increased to $1022.13 in 2010. Again, total health expenditure as a percentage of GDP increased from 8.81 percent in 1995 to 10.39 percent in 2010 (World Bank, 2012).

**Figure 2. 1: Global health expenditure for the years 2000, 2011 and 2015**




Source: World Health Statistics, 2014; 2018

Though there has been a significant increase in health expenditure globally, growth in health expenditure in SSA has been minimal (Figure 2.2.1). The region has had low growth in per capita health spending compared with other regions of the world, except for South Asia which spends lesser amounts on health but has higher health outcomes as measured by key indicators such as infant, under-five and maternal mortality rates and life expectancy. In the year 2010, the SSA region recorded an average per capita health expenditure of US$84 (more than double for that of 1995, US$ 32) compared with US$47 for South Asia, Latin America and the Caribbean (US$670), East Asia and Pacific (US$183), Middle East and North Africa (US$203) and Europe and Central Asia (US$438) (World Bank, 2013). Between 1995 and 2010, the proportion of total health spending to GDP slightly increased from 5.8 percent to 6.5 percent and the share of health spending as a fraction of total government spending increased from 5.8 percent in 2004 to 6.8 percent in 2010 in SSA.

Even though the region has seen some increments in the health expenditures, much of the increase is driven by external sources with greater variations existing in magnitudes in various countries. The regions of the Americas, European, Eastern Mediterranean, and Western Pacific have had a constant rate with the Americas and the European having the least of 0.1 percent. The rise in the external health finance in Africa over the years after 2000 is aimed at helping African countries overcome their challenge of contributing highest of the global disease burdens and mortality such as reducing maternal mortality and infant mortality ratio through the provision of insecticide-treated mosquito nets to pregnant women and nursing mothers.

Between 1995 and 2002, health expenditure per capita in SSA saw a continuous decline of 0.001 percent. This decline was motivated by high population growth rate and political instability across the region that led to the breakdown of health infrastructure and movement of health personnel to other regions of the world (Ashiabi, 2013). In the year 2000, the region contributed an average of 5.6% of its income on health which was below the World's average of 8.2% whiles 6.5% of its health expenditures were externally provided (WHO, 2014). It is important to note, that though the average expenditure on health in the region was low, countries such as South Africa, Sao Tome, and Principe and Sierra Leone's contributions were above the world's average with Sierra Leone contributing the highest (18.4%) of its gross domestic product on health. Much of these higher expenditures among the countries mentioned above are as a result of post-war reconstruction expenditure. Countries such as Congo, Equatorial Guinea and Gabon were the least contributors with 2.1%, 2.4% and 2.9% respectively whiles Guinea and Zambia's contributions were not different from the region's average of 5.6%. Countries such as DRC, Guinea Bissau and Guinea had the highest in terms of private health expenditure as a percentage

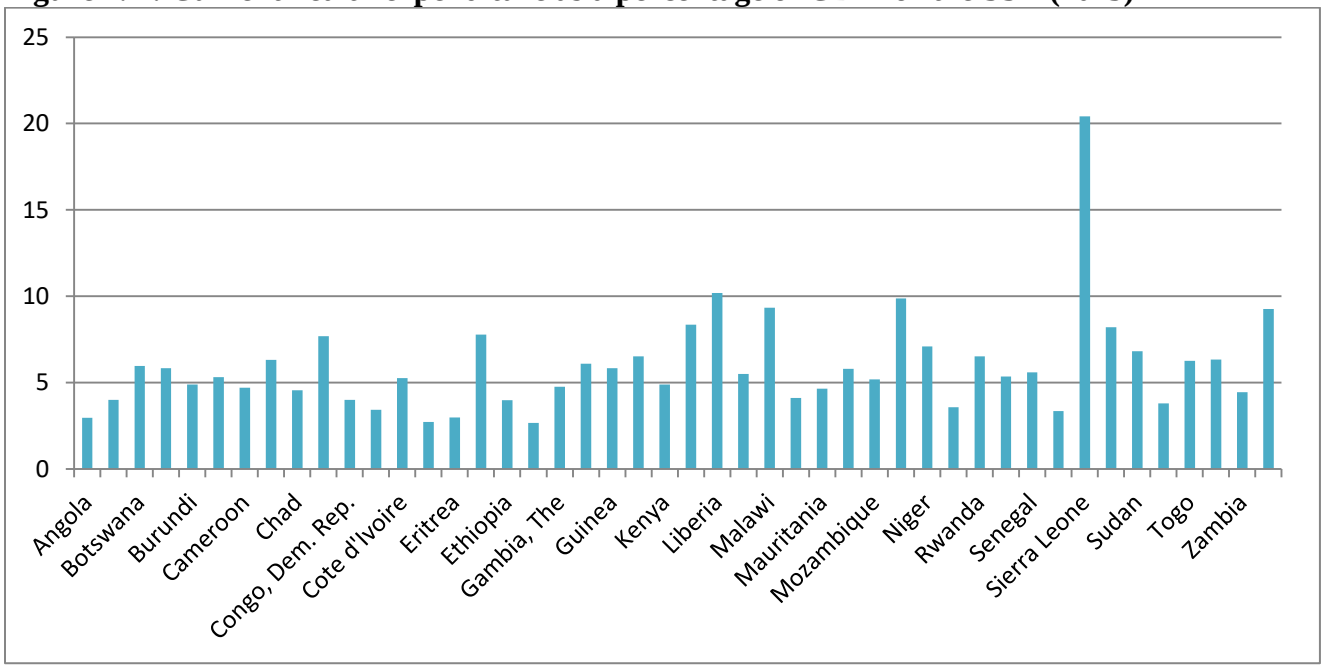
of total health expenditures with 95.5%, 89.5% and 80.6% respectively whiles Seychelles had the least private health expenditure as a percentage total health expenditure of 17.3%.

The poor health care financing in Africa and other developing countries led to the declaration of the millennium development goals in the year 2000 by 189 countries of which SSA was inclusive with health improvements as one of its critical motives. This notwithstanding led to the Abuja declaration in 2001 where all heads of states in Africa met to make a promise of contributing 15 percent of total spending to the health sector. By the year 2005, a few years after the declaration, only 5 sub-Saharan African countries (Burkina Faso, Lesotho, Liberia, Malawi, and Rwanda) have achieved the said targets.

As of 2011, ten years after the Abuja declaration, only six countries had achieved this. The countries included Liberia (18.9 percent), Malawi (18.5 percent), Madagascar (15.5 percent), Togo (15.4 percent), Zambia (16.0 percent) and Rwanda with the highest (23 percentage) (World Bank, 2012; Novignon & Novignon, 2017). It is important to note that though these countries were able to meet the declaration in 2011; their health outcomes were not comparable to the world's average. As of 2011, Liberia's post-war health reconstruction expenditure recorded 62.2 (per 1000 live births) for infant mortality, 26.3 (per 1000 live births) for neonatal mortality and under-five mortality rates of 84.6 (per 1000 live births) which were all above the world's average. Although Congo was the country that contributed least of its income to health (2.1%) in 2000, it had increased its contribution to 3.4% which represented 8.7% of the general government expenditure as at 2015 (see Figure 2.2.2). Equatorial Guinea also increased its resources on health from 2.4% in 2000 to 2.7% as at 2015 whiles Gabon recorded a decline from 2.9% in 2000 to 2.7% in 2015 (see Figure 2.2.2). Government expenditure on health as a

percentage of total government expenditure saw an increment from 8.7%, 9.7% and 9.9% for the years 2000, 2010 and 2014 respectively (WHO, 2018).

**Figure 2. 2: Current health expenditure as a percentage of GDP for the SSA (2015)**




Source: WDI, 2019

## 2.3 Trends in Health outcomes in SSA between 2000-2015

### 2.3.1 Infant and Under-five mortality rates

Infant mortality rate (IMR) refers to the death of young children under age one year expressed in terms of 1,000 live births and under-five mortality rate (U5MR) is the probability of a child born in a specified year dying before reaching the age of five if subject to current age-specific mortality rates expressed as a rate per 1,000 live births. These are used concepts viewed as methods of measuring the population's well-being. Infant mortality is further considered as a modest indicator of the 'availability, utilization and effectiveness of health care systems and thereby used for observing and designing population and health programs' (Anyanwu, 2007).

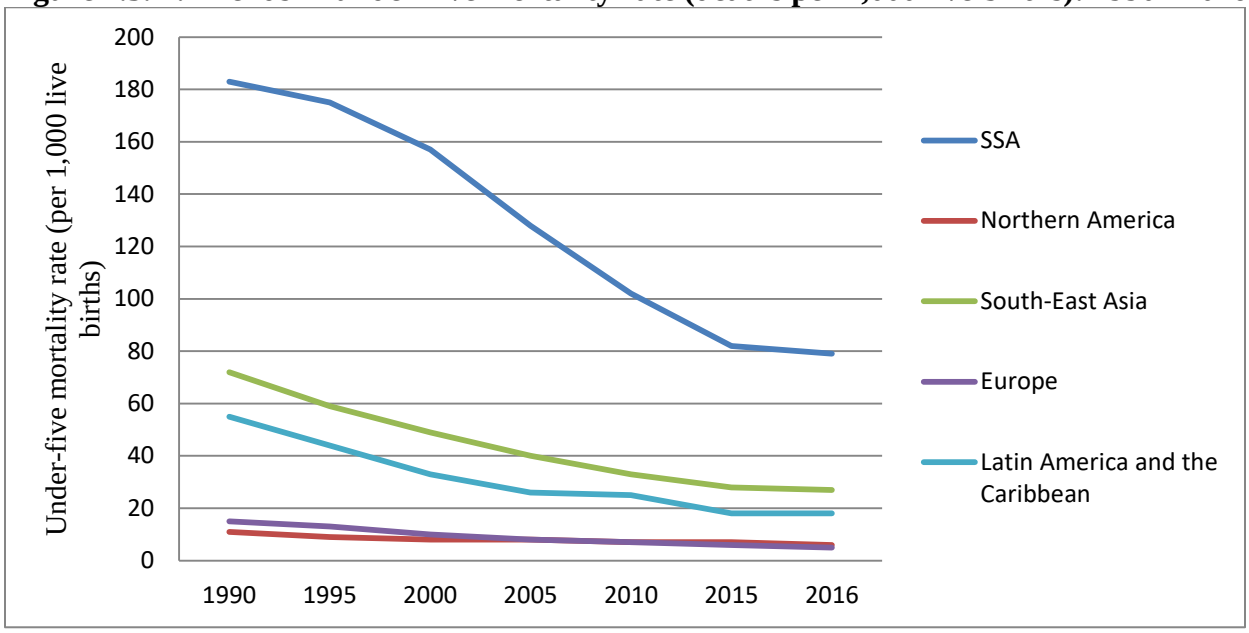
During the 1960s and 1970s, infant and under-five mortality rates were very high for all regions of the world. However, considerable efforts have been made since 1990 to curb this situation. Under-five deaths reduced from 12 million in 1990 to 7.6 million in 2010 worldwide while infant mortality rate also reduced from an average of 98 per 1,000 live births in 1990 to 63 in 2010 in developing countries (UNO, 2012). Between 1990 and 2012 (see Figure 2.3.1), U5MR in SSA reduced from 173 to 95 per 1000 live births though greater than the world's average of 48 and further reduced to 82 live births in 2015, whiles' infant mortality also dropped from 105 to 63 per 1,000 births. A third of the death rates occur at the neonatal stage (the first 28 days from birth) and it is fueled by complications of prematurity, birth asphyxia and infections (WHO, 2014, UNICEF, 2017). The declines in these mortalities could be as a result of factors such as the increases in health outlays which lead to provision and enhancements in health facilities, medical breakthroughs, training of health workers and providing vital drugs which help in the treatment and curing of diseases that would have increased deaths among children and infants (Ashiabi, 2013).

From Figures 2.3.1 and 2.3.2, both U5MR and neonatal mortality rates continue to see a decline for all regions since 1990 but the rate remains high in many developing countries especially SSA. The rate of reduction in under-five mortality in SSA doubled from an average rate of 1.2 percent for the period 1990-2000 to 2.4 percent for 2000-2010 (UNO, 2012). Neonatal deaths continue to be high in SSA due to most mothers not receiving the best nutrition during pregnancy; they lack access to antenatal care during pregnancy and as well no skilled care is given during childbirth and even two days after birth (Ashiabi, 2013). The mothers of those newborn babies are challenged with dying during and an even after delivery. As a result, these babies face a greater risk of illness and death from insufficient care and below optimal feeding

practices. These situations lead the region to contribute three-quarters of deaths occurring during the first 24 hours. Deaths in this period account for a third of the deaths of all the children below 5 years of age (WHO, 2014).

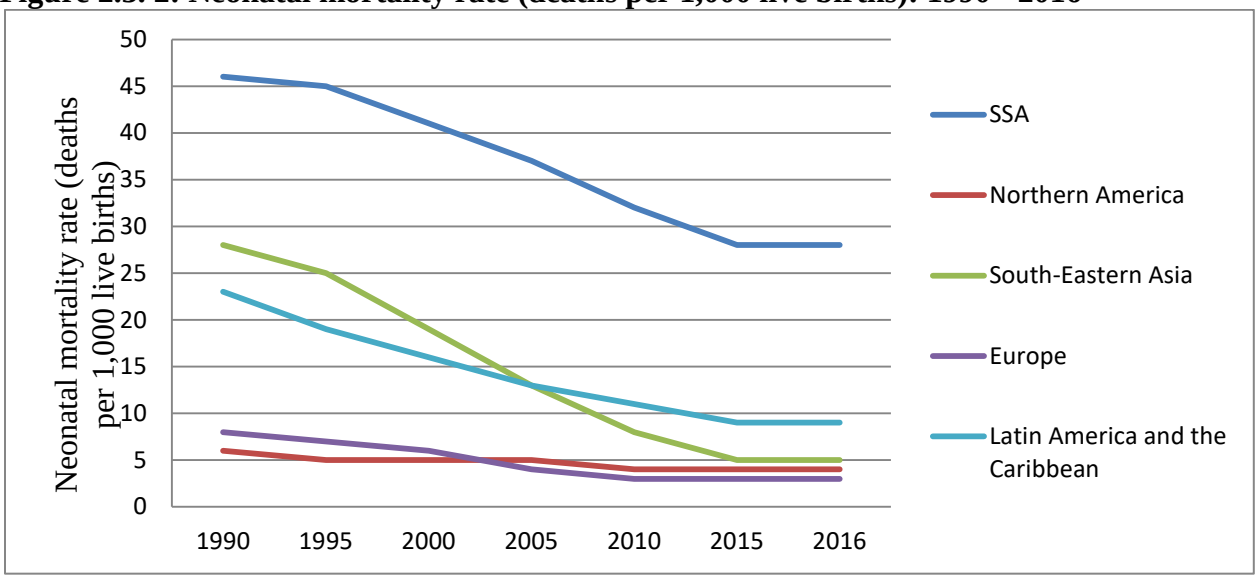
Again, the high U5MR in the region could be attributed to inadequate sanitation and access to improved water sources leading to outburst and spread of illnesses such as cholera and diarrhea of which children are the most victims as well as poor coverage of immunization programs in the region (Ashiabi, Nketiah-Amponsah, & Senadza, 2016).

**Figure 2.3. 1: Trends in under-five mortality rate (deaths per 1,000 live births): 1990 - 2016**




Source: UNICEF, 2017

**Figure 2.3. 2: Neonatal mortality rate (deaths per 1,000 live births): 1990 - 2016**




Source: UNICEF, 2017

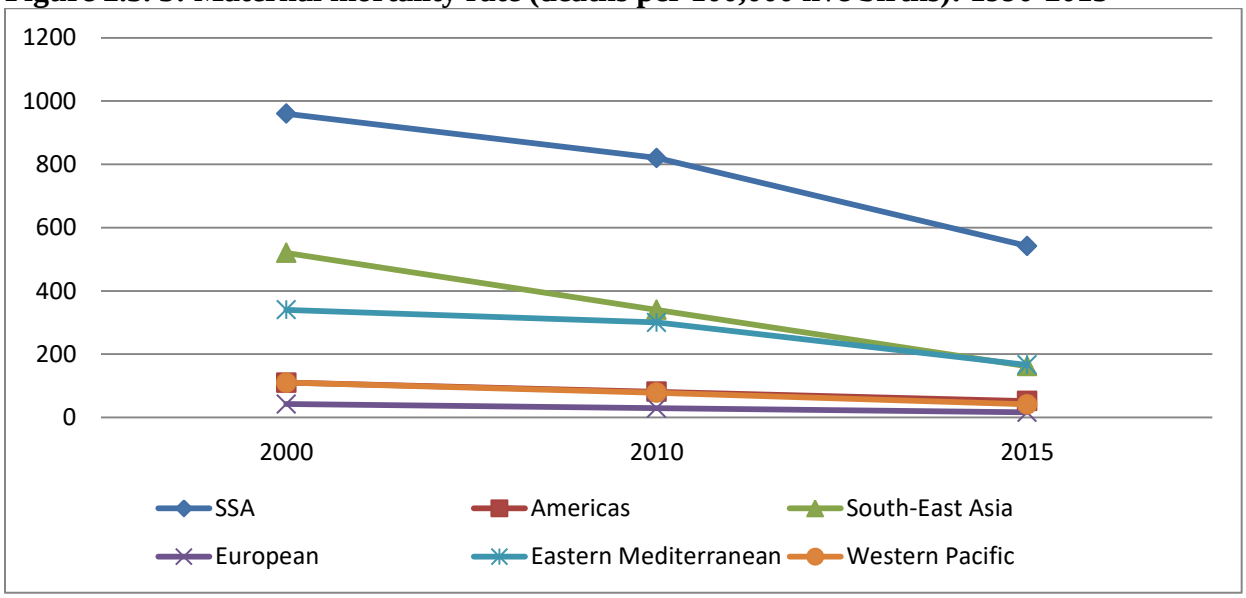
From Figures 2.3.1 and 2.3.2, SSA continues to be the region with higher rates of U5M and neonatal mortalities though efforts have been made to reduce them. South-Eastern Asia was second to SSA in terms of regions with higher rates of under-five and neonatal mortality rates before the year 2005. After the said year, South-Eastern Asia has been able to reduce its rates of neonatal mortalities and has placed third in terms of regions with lower rates of neonatal mortalities. Again, before the year 2005, Europe was second in terms of countries with lower rates of under-five and neonatal mortalities but has equipped her institutions coupled with her health expenditures to become the region with the least rates of under-five and neonatal mortalities after the year 2005.

### 2.3.2 Maternal mortality

Maternal mortality ratio (MMR), women who die through pregnancy, childbirth and six weeks after delivery, per 100,000 live births, is also a crucial indicator of the quality of health systems

across countries. WHO and UNICEF (2012) show that about 80 percent of maternal deaths are avoidable as data suggest that more than 350,000 pregnant women die yearly from complications during pregnancy and childbirth with almost 99 percent of the deaths occurring in developing countries. Between 1990 and 2013 (see Figure 2.3.3), there was a 48 percent reduction in the maternal mortality rate within the region. However, the period between 1990 and 2010 saw countries such as Rwanda, Equatorial Guinea, Botswana and Eritrea achieving an average of 8.7%, 7.9%, 7.5% and 6.3% reduction in maternal mortality rates respectively (World Health Statistics, 2014).

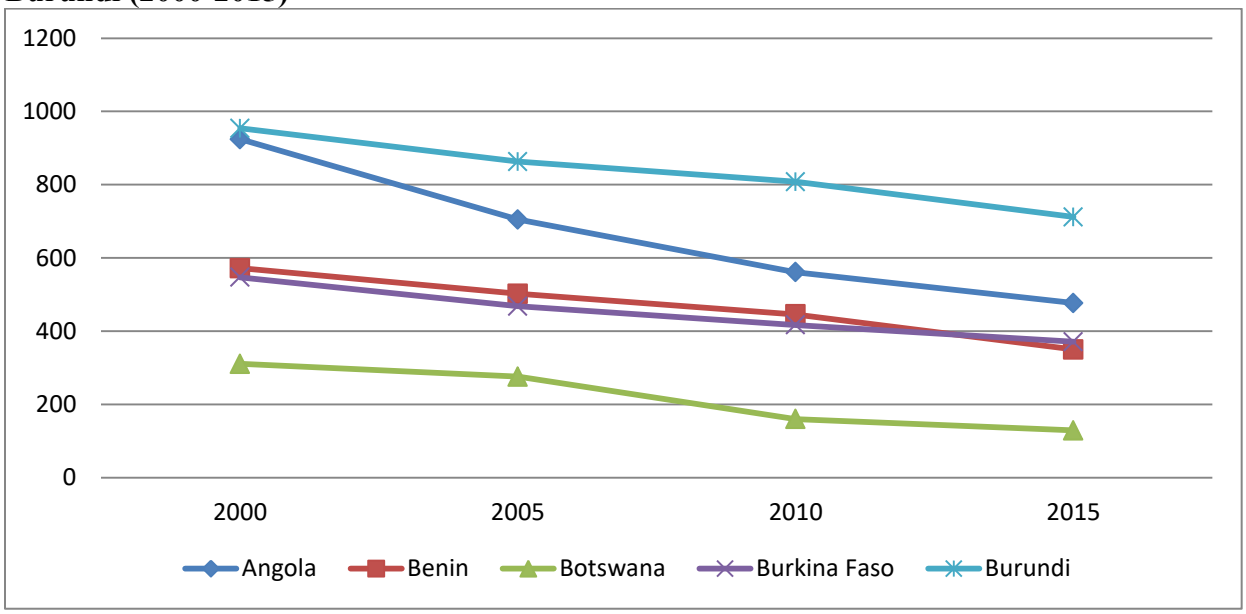
**Figure 2.3. 3: Maternal mortality rate (deaths per 100,000 live births): 1990-2015**




Source: World Health Statistics, 2014; 2018

Figure 2.3.3 shows that maternal deaths for all regions across the globe continue to see a downward trend since 1990 with Europe having the least. Although Africa continues to make progress in reducing maternal deaths, it remains the region with the highest contributor to maternal mortality since 1990.

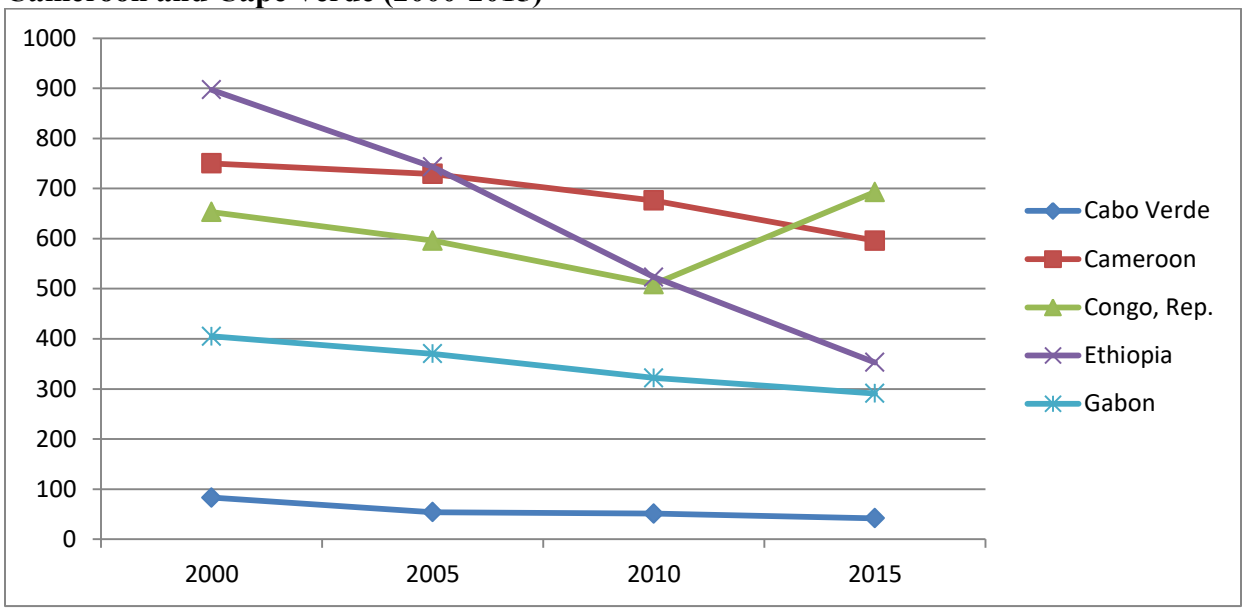
**Figure 2.4. 1: Maternal Mortality Rate for Angola, Benin, Botswana, Burkina Faso and Burundi (2000-2015)**




Source: WDI, 2015

Among the five countries shown in Figure 2.4.1, Burundi is the country with the highest rates of maternal mortality since the period 2000-2015 whiles Botswana remains the least among the group. Before 2010, Benin had maternal mortality rate of 547 per 100, 000 live births in the year 2000 but had been able to work at reducing it to 350 per 100, 000 live births in 2015. Burkina Faso and Benin had the same rates of maternal mortality in the year 2000 but Burkina Faso was able to record rates slightly lower than Benin in 2005 and 2010 but in 2015, Benin was also able to record rates marginally below Burkina Faso. Although Angola remains fourth among the group of countries in Figure 2.4.1, it has been able to decrease its maternal death rates from 954 per 100, 000 live births to 477 per 100,000 live births in 2015. Much of Angola's success in reducing its maternal mortality rates are due to an increase in government health expenditure with an average of about 53.84 percent for the period 2000-2015.

**Figure 2.4. 2: Maternal Mortality Rate for Angola, Gabon, Ethiopia, Republic of Congo, Cameroon and Cape Verde (2000-2015)**

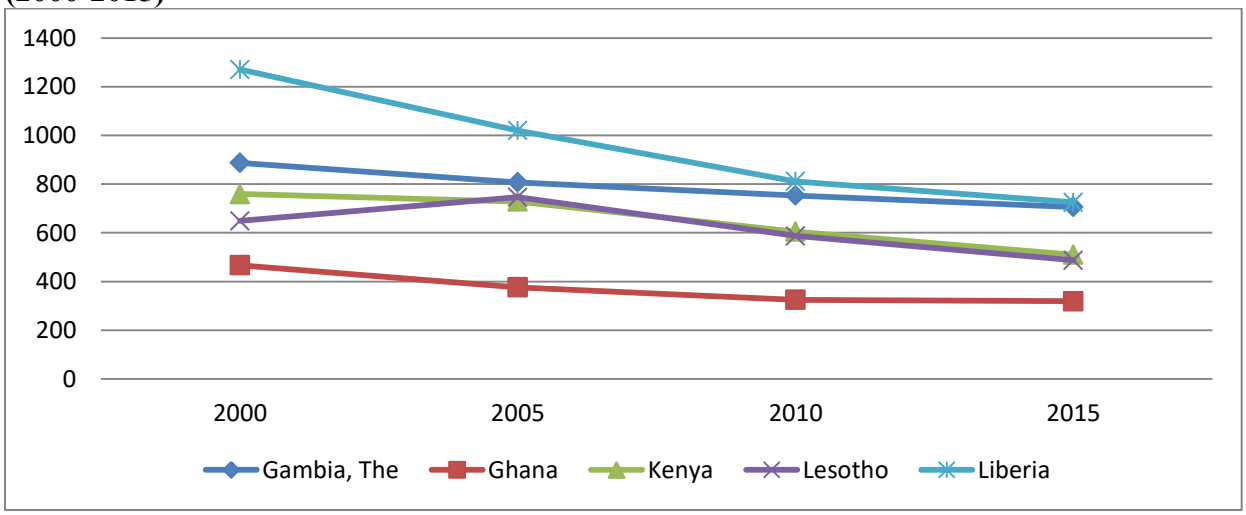



Source: WDI, 2015

From Figure 2.4.2, Ethiopia has made tremendous efforts in reducing maternal mortality rates from 2000 (897 per 100,000 live births) to 2015 (353 per 100,000 live births). Cameroon has performed slowly in reducing its maternal mortality from the year 2000-2015 while the Republic of Congo also recorded 653 maternal deaths per 100,000 live births in 2000 but reduced to 509 per 100,000 live births in 2010 which saw a further increase to 693 maternal deaths per 100,000 live births in the year 2015. The increase in the maternal mortality in Congo could partly be attributed to the poor performance of the institutions in the country mandated with the responsibility of ensuring good health because both public and private health expenditure, as well as other key determinants of health such as access to good drinking water and urban population, saw improvement within that period. Also, Cape Verde was able to maintain her record of being among the few countries in SSA with lower maternal mortality rates. Within the period 2000-2015, Cape Verde was able to reduce the maternal deaths from 83 to 42 per 100,000

live births in 2015. Much of the success could be attributed to the institutional setups in the country since its public, as well as private health expenditures, did not see much increase.

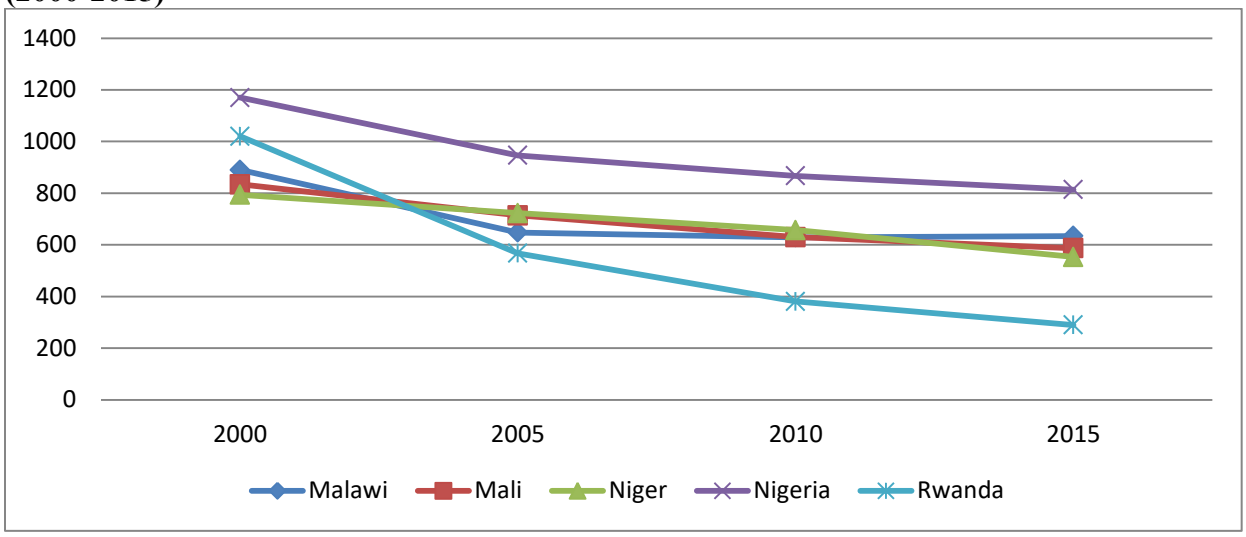
**Figure 2.4. 3: Maternal Mortality Rate for Gambia, Ghana, Kenya, Lesotho and Liberia (2000-2015)**




Source: WDI, 2015

Figure 2.4.3 shows that Lesotho had an increase in her maternal deaths from 649 in 2000 to 746 per 100,000 live births in 2005 but recorded a continuous decrease from 2005 to 2015 (487 per 100,000 live births). Liberia was able to reduce her contribution to maternal deaths in the region from 1270 in 2000 to 725 per 100,000 live births in 2015. Much of Liberia's contribution to maternal deaths in the region was due to the war which the nation suffered before the year 2000 while her relentless effort towards reducing maternal deaths in recent years stem from higher government expenditure in the sector for the reconstruction after the war. Between the years 2000-2015, Ghana was able to reduce her maternal mortality rates of about 31 percent from 437 in 2000 to 319 per 100,000 live births in 2015. Ghana's contribution to reducing maternal deaths comes from the introduction of health insurance between the periods under review which also had free maternal delivery as part of the benefits to subscribers.

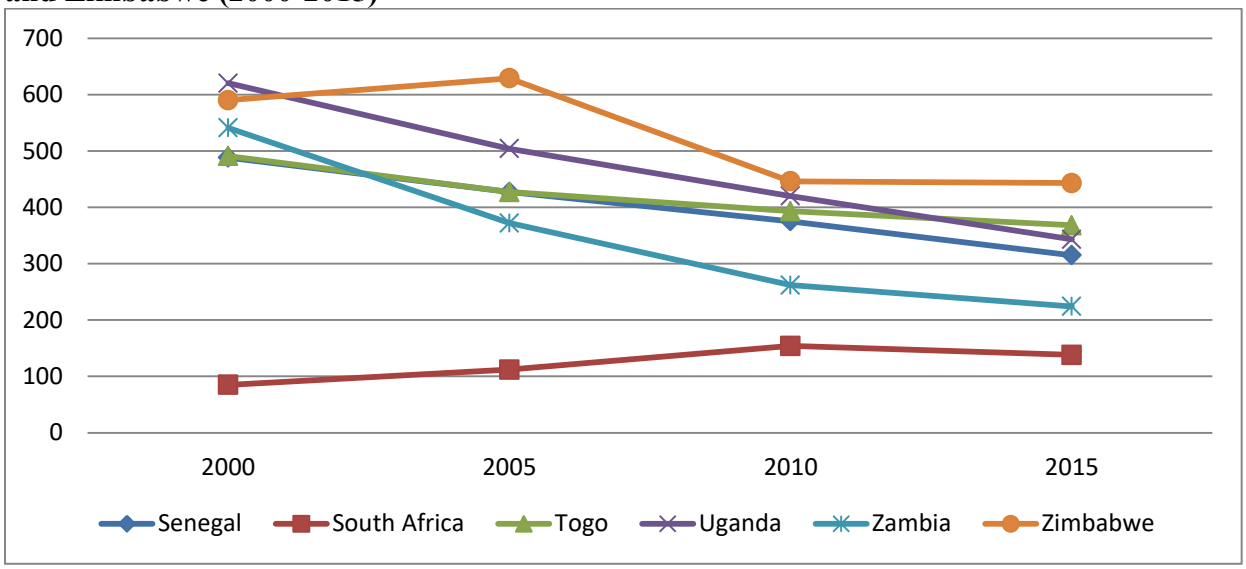
**Figure 2.4. 4: Maternal Mortality Rate for Malawi, Mali, Niger, Nigeria and Rwanda (2000-2015)**




Source: WDI, 2015

Among these group of countries as depicted by Figure 2.4.4, Nigeria continues to be the country with highest maternal deaths from 2000 to 2015 although it has recorded a decline of maternal deaths from 1170 in 2000 to 946 per 100,000 live births in 2005 and a further decline to 814 per 100,000 live births in 2015. Mali, Malawi and Niger have all seen a reduction of about 30.7 percent, 28.8 percent and 30.4 per cent respectively from the period 2000 to 2015. Between the same period (2000-2015), Rwanda has had a significant reduction in maternal deaths from 1020 to 290 per 100,000 live births which represent 71.6 percent. Rwanda's impressive performance in reducing maternal deaths after the war is the result of strong institutions built after the war and the government increasing the health expenditure after the war.

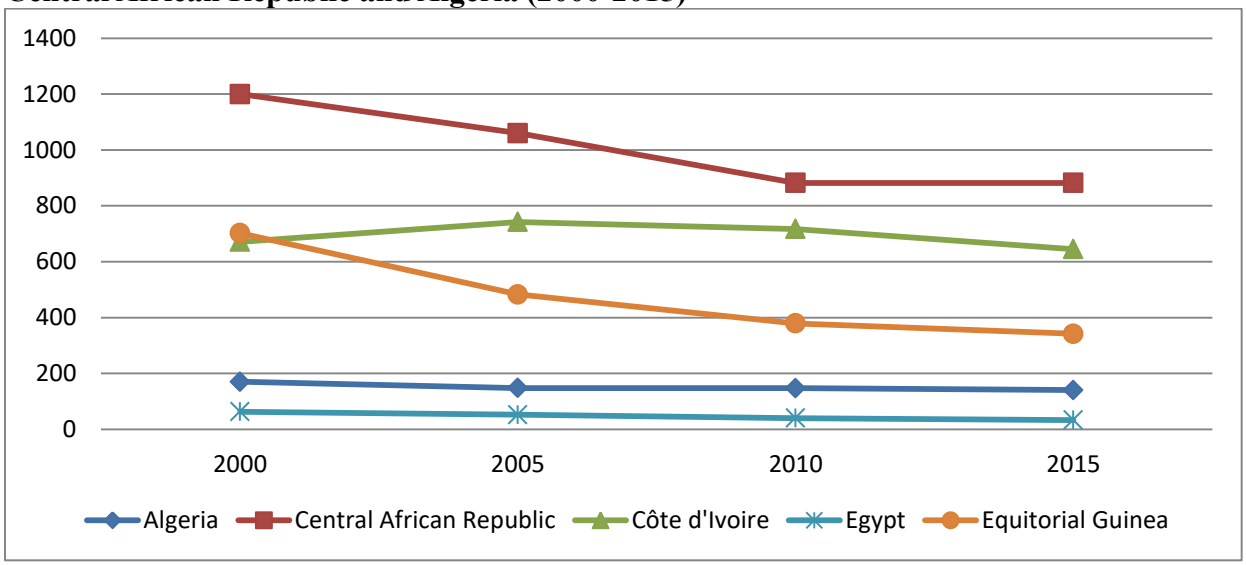
**Figure 2.4. 5: Maternal Mortality Rate for Senegal, South Africa, Togo, Uganda, Zambia and Zimbabwe (2000-2015)**




Source: WDI, 2015

Figure 2.4.5 shows that Zimbabwe's performance in reducing maternal deaths has been below expectations. As at the year 2000, Zimbabwe had maternal mortality rate of 590 per 100,000 live births which increased to 629 per 100,000 live births in 2005. After the year 2005, maternal deaths declined to 446 per 100,000 live births in 2010 while between 2010 and 2015, maternal deaths reduced by 3 per 100,000 live births. Unfortunately, South Africa has had a continuous increase in maternal deaths from 2000 to 2015 from 85 to 138 per 100,000 live births. Meanwhile, Zambia, Senegal, Togo and Uganda has recorded a downward trend of maternal deaths between 2000-2015 but Zambia has performed better in reducing maternal deaths than the other countries within the group shown in Figure 2.4.5.

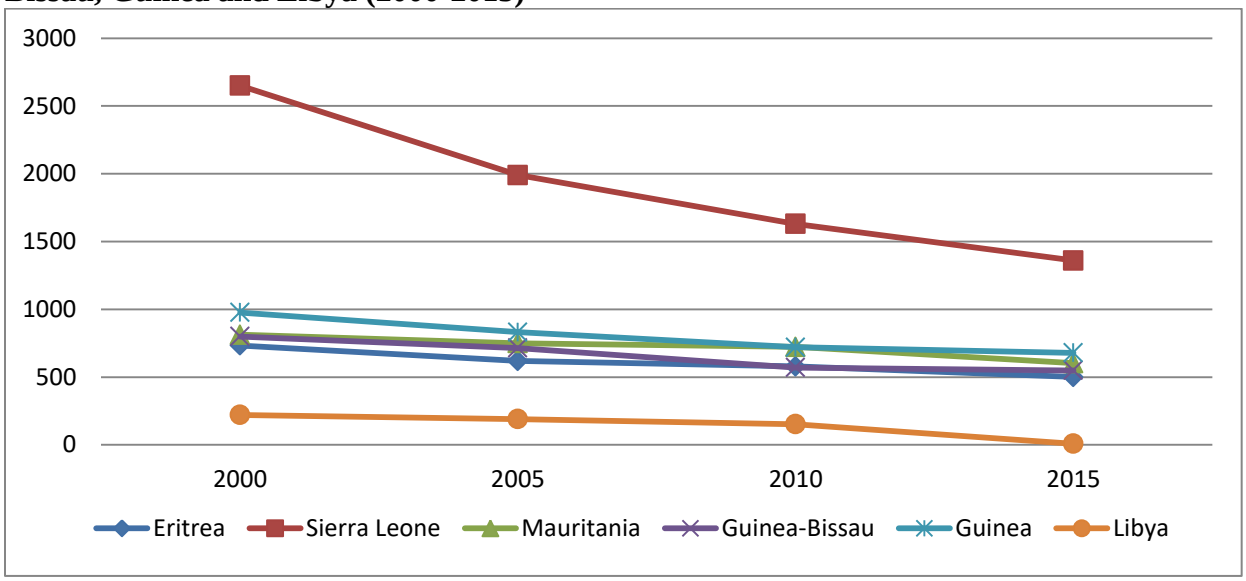
**Figure 2.4. 6: Maternal Mortality Rate for Equatorial Guinea, Egypt, Cote d'Ivoire, Central African Republic and Algeria (2000-2015)**




Source: WDI, 2015

From Figure 2.4.6, Equatorial Guinea has made great efforts to reduce maternal deaths from 702 (per 100,000 live births) in the year 2000 to 483 (per 100,000 live births) in 2005 and further reduced the rate to 342 (per 100,000 live births) in the year 2015. Equatorial Guinea's performance is as a result of the health sector reforms made by the government between 1996-2000 and 2002-2006 (WHO, 2017). While the Central African Republic experienced a continuous decline in maternal deaths from 2000 to 2010 averaging about 26.5 percent and a constant rate within the years 2010 and 2015, Cote d'Ivoire saw an increase in the maternal deaths between 2000 and 2005 but afterward has had a continuous decline of about 13 percent between 2010 and 2015. The cause for the increased maternal deaths between 2000 and 2005 was the result of Hemorrhages (34%), infections (21%), risky abortions (18%), hypertensive illnesses (16%) and dystocia (11%), compounded by indirect causes such as malaria, anemia, malnutrition, hepatitis and HIV/AIDS (UNICEF, 2007). Egypt and Algeria remain the countries with the least maternal deaths with reduction rates of about 17.6 percent and 47.6 percent for both Algeria and Egypt respectively between the years 2000-2015.

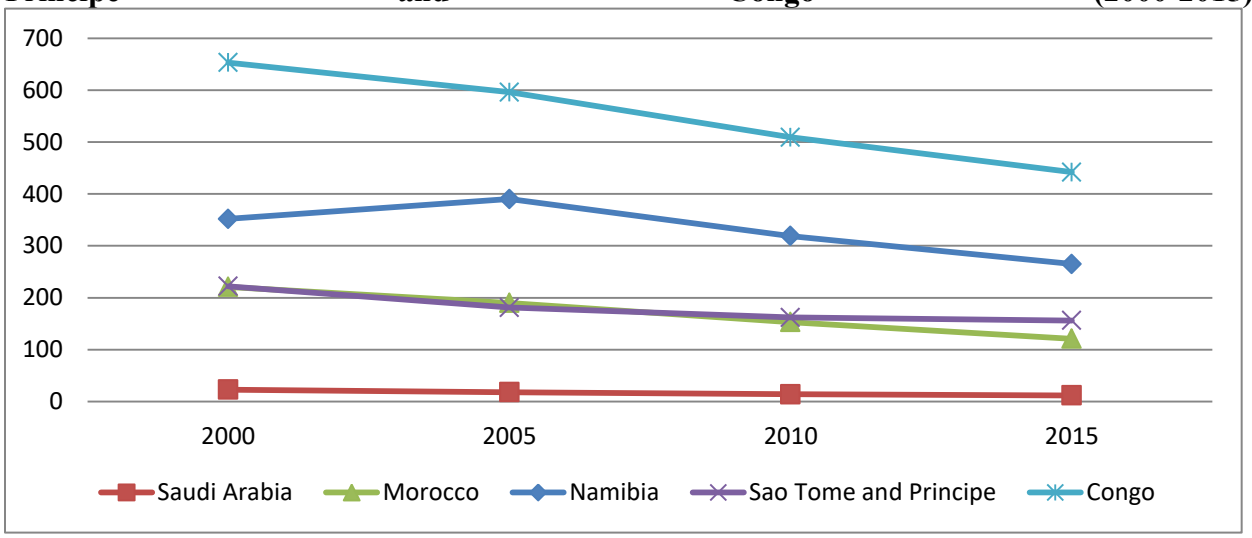
**Figure 2.4. 7: Maternal Mortality Rate for Eritrea, Sierra Leone, Mauritania, Guinea Bissau, Guinea and Libya (2000-2015)**




Source: WDI, 2015

As regarding Figure 2.4.7, it could be seen that Libya has made a remarkable improvement in reducing maternal deaths of about 95.9 percent between the years 2000-2015 from 221 to 9 per 100,000 live births within the said year making Libya became the country with least maternal death in 2015. Among the group of countries shown in Figure 2.4.7, Sierra Leone which has the highest maternal mortality remains the country who recorded the highest maternal deaths in 2015 for SSA as a whole. In the year 2000, Sierra Leone recorded maternal deaths of 2650 per 100,000 live births. The high rate of the maternal deaths in Sierra Leone was influenced by the war which started in 1991. After the year 2002 when the war came to a halt, the country had made gradual improvements in reducing maternal deaths from 1,990 (per 100,000 live births) in 2005 which reduced to 1630 (per 100,000 live births) and 1360 (per 100,000 live births) for the years 2010 and 2015 respectively. Between the years 2000-2015, Mauritania, Guinea, Guinea Bissau and Eritrea have all recorded a decline in maternal deaths averaging about 26 percent, 30.4 percent, 31.4 percent and 31.7 percent respectively.

**Figure 2.4. 8: Maternal Mortality Rate for Saudi Arabia, Morocco, Namibia, Sao Tome and Principe and Congo (2000-2015)**




Source: WDI, 2015

Figure 2.4.8 shows that Sao Tome and Principe has reduced her maternal deaths marginally between 2000 and 2015 from 222 to 162 per 100,000 live births in 2010 and further decreased to 156 per 100,000 live births in 2015. Although Congo has made significant progress in reducing maternal deaths in the country, it continues to remain the highest among the group of countries shown in Figure 2.4.8 since 2000. The case of Namibia is not different from Cote d'Ivoire whose maternal death rate increased between the years 2000 and 2005 but declined the years afterward. Between 2005 and 2010, Namibia registered an average of 18.2 percent reduction in maternal deaths as the average reduction rate of maternal mortality between 2010 and 2015 was also 16.9 percent. Saudi Arabia has performed significantly well in reducing maternal deaths over the period under review. The country has been able to reduce maternal deaths from 23 in 2000 to 12 per 100,000 live births in 2015.

## 2.4 Summary

The growing concern for universal health coverage (UHC) has made health expenditure very critical across the globe. This comes as a result of the known association between health expenditure and outcomes in the literature. Over the years, health expenditure in SSA has seen a continuous increase than other regions although SSA remains the region with the least health outcome. As a result of the increased health expenditure in the region, under-five mortality rates reduced from 173 to 95 per 1000 live births between the years 1990 and 2012 though it was still greater than the world's average of 48. Maternal deaths in the region also reduced by 48 percent between 1990 and 2013 whiles Eritrea recorded the lowest average maternal deaths of 6.3 percent between 1990 and 2010.

# CHAPTER THREE

# LITERATURE REVIEW

## 3.1 Introduction

This chapter brings to light the theoretical and empirical works that justify the essence of this study. This chapter contains five sections. The first section, section 3.2 looks at theoretical reviews while section 3.3 outlines the empirical works on the health expenditure and health outcomes. Section 3.4 looks at how governance and institutional quality affect health expenditure and outcomes while section 3.5 summarizes the chapter.

## 3.2 Theoretical review

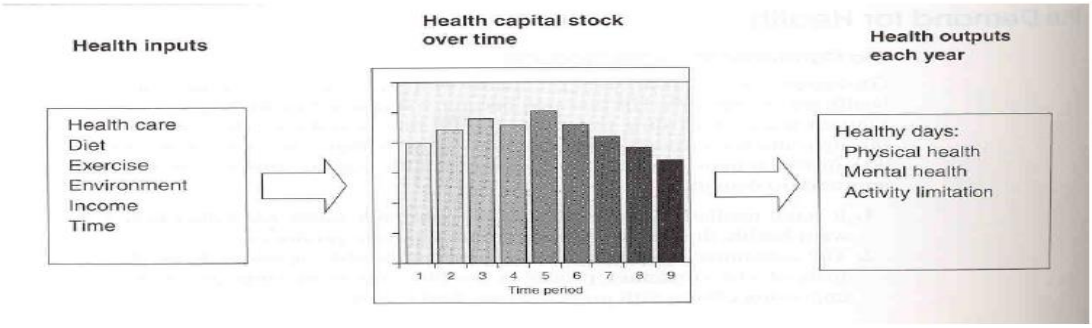
### 3.2.1 Grossman's Human capital model

Grossman (1972) used the model of human capital to describe the demand for health and healthcare. The model is founded on a crucial concept of health being a fundamental good implying that demand for health surpasses demand for healthcare.

The theory of human capital explains that humans invest in themselves via education, health and training to increase their incomes. Grossman explains that consumers demand medical inputs to produce health but are not interested in medical care as a result of making a demand for healthcare a derived demand. He further explained that health is a capital good, hence, it does not depreciate instantly. Not only can health be acknowledged as a capital good but also, health can be seen as a consumptive good. As a consumption good, people demand health because it makes them feel better. People desire health because it increases the number of healthy days they have

available for work to earn income, hence, the investment purpose for demanding health. Thus, humans are both consumers and producers of health.

**Figure 3. 1: Diagram outlining the concept of health capital.**




*Source:(Folland, Goodman, & Stano, 2013)*

As seen from Figure 3.1, a consumer can perceive as the stock of health as a capital good which provides the ultimate output of healthy days. He or she might measure the stream of the outcome as a single element of healthy days or numerous elements of physical health, mental health and limited activity. Consumers apply an array of health inputs which includes market inputs of health care, diet, exercise and time to their physical makeup which contributes to the investments in health capital. But over time, these stocks of health may grow, remain unchanged or decline either slowly with age, or more quickly with an illness or an injury.

It is interesting to note that the model assumes an individual is self-governing and as a result has complete and perfect information about their health capital, marginal benefits of present and future investment into health. However, McGuire, Henderson, and Mooney (1988) contended that such an idea is an abstraction and unrealistic as it shirks the uncertainty associated with the stochastic nature of disease occurrence and the unpredictability of the future healthcare costs.

Again, the presence of the principal-agent relationship within the healthcare market makes the model's assumption of perfect information more challenging as it is difficult to model demand for health and healthcare and neglect key decision-makers in the sector – physicians. This explains that the healthcare market cannot be endogenous and as such must operate within certain jurisdictions that will ensure that both producer and consumer are satisfied with the outcome from their engagements.

### 3.2.2 The Health Production Function

This theory advances that an individual combines health inputs in producing health. This means that an individual has greater control over their wellbeing arising from the fact that they can influence their health through their environment, consumption patterns and healthcare utilization.

According to the health production function, create their outputs by combining inputs which are mainly labor and capital. The production function is the relationship that connects the firm's inputs with its outputs. The theory of the demand for health adopts this idea and considers the individual to be "producing" health by combining "health inputs". Inputs such as education, sanitation and food are examples of what the individual invests into his health production function whose outputs can be measured in terms of Quality-Adjusted Life Years (QALY) and Body Mass Index (BMI).

At the national level, the health of the nation is measured in relation to life expectancy, child mortality, infant mortality and maternal mortality as well as others.

A critical feature of the health production function is the law of diminishing marginal productivity. The law suggests that the employment of more health inputs give rise to improvements in health, however, the successive additions of the health inputs will result in smaller increments in health. This gives rise to a non-linear and non-monotonic association between health inputs and health. The principle of diminishing marginal productivity in the production of health is evidenced in the variation of health between the developing and advanced countries, where in developing countries, health and health inputs are very small but small upturns in health inputs generate relatively bigger effects on health compared with developed countries where health inputs and health are higher.

The health production function shows the quantity of health that can be derived from a given set of health inputs with a particular state of technological knowledge. But, the level of technology is not constant over time since it advances in response to increment in medical science. Thus, a country's health production function can be seen to some extent depend on the state technological knowledge prevailing in that country. Hence, when the state of technological knowledge available in a country changes, the efficiency of producing health changes as well. It is therefore critical to acknowledge the effects of knowledge on the health production function. In the health sector, producers are players who are endowed with much knowledge about health for which reason consumers seek them as agents to mediate between them and their health. The superior knowledge about disease conditions possessed by the physicians could cause them to induce consumers to demand more or less health than what will be optimal. As a result, a body needs to mediate both the physicians and consumers to ensure that both parties achieve their purposes.

### 3.3 Empirical literature review

The decade before 1990 did not have health expenditure disaggregated into private and public health expenditures. This situation resulted in the contrasting views on the influence of health spending on health indicators in the literature from no impacts to limited impacts while others find the effect on only specific interventions (Aloka, 2015). Public health expenditure includes capital and recurrent spending from both central and local government budgets, external borrowings and social health insurance funds and grants whereas private health expenditure comprises of out-of-pocket spending, charitable donations, direct service payments made by corporations and private insurance (IEA, 2010). The recurrent and capital spending from government (both local and central) ensures the establishment of health facilities and payment of health workers among others whereas private insurance (a section of private health expenditure) enhances a person's access to health care (Ashiabi, 2013).

Even though there was no consensus on the influence of health outlays on outcomes before the said period, Schultz (1961), had acknowledged that investment in human capital was the basis for the faster growth in Western nations and therefore proposed that outlays in direct health expenditure is critical to achieving economic growth and improvement in productivity. This was further advanced by Politi et al., (1995) who used a sample of 40 developing countries with data from 1985-1990 to examine the effect of reducing poverty and health spending on health status. The authors used the OLS estimation method and concluded that although income per capita is a significant predictor of health status, it is not the driver of health status. This is explained by Politi et al., (1995) that factors such as female education, income inequality, income and cultural factors such as the extent of ethnolinguistic fractionalization are the key influencers. In measuring health status, the researchers used life expectancy at birth, under-five and infant

mortality rates as the health outcome variables while the independent variables were the ratio of public health expenditure to gross national product, gross national product per capita and the prevalence of total outright poverty. Their results indicated gross national product to be positive and had a significant relationship with health outcome while a reduction in poverty also directly affects health. But public health expenditure was found to be insignificant. Well, given the large number of countries studied, Politi et al., (1995) ignored the individual country characteristics which are unique to each country, thus assumed that all the developing countries studied are the same but we cannot conclude on that with ease. As a result, if the panel fixed effect method was used, it could account for the differences within each country to make the results more robust.

Other researchers such as Musgrove (1996) and Kim & Moody (1992) likewise discovered parallel outcomes of a lack of significance of the correlation between public health spending and the associated outcomes. Politi et al., (1995) addresses this challenge that public health spending is not an efficient measure of the government's effort to financing basic healthcare. They further stated that public health expenditure fails to take into account the extent to which health service systems are efficient in delivering their mandate and at the same time does not account for the finance of complementary determinants of health such as basic education, water and sanitation, hence, the non-significant link between public health spending and health outcomes.

Though much of the works done before and during the 1990s concluded on no significant effect between public health expenditure and expected health outcomes, some concluded otherwise. For example, Anand & Ravallion (1993) sampled 86 developing countries via the method of descriptive analysis to investigate the correlation between human developments and gross national product. They concluded that public provision of essential services such as healthcare promotes social outcomes. They continued that as average income levels rise, people can

purchase essential public services that can promote health and nutrition, lowers mortality and increases life expectancy. But these benefits are achieved if the growth is used to finance suitable or appropriate public goods, suggesting that economic growth results in better social services. Despite the different time periods within which the two authors, Politi et al., (1995) and Anand & Ravallion (1993) presented their work both suffer from the same conceptual predicaments. Anand & Ravallion (1993) also assumed that all the 86 developing countries are the same for which cause they lump all the developing countries together. Grouping the developing countries into different categories such as income levels or even dealing with them individually could account for the time-invariant features which may be peculiar to each country and are likely to influence the outcome of their study.

Much of the contrasting views concerning the effects of health spending on health outcomes before the year 2000 were due to the non-distinction between public and private health expenditures before the period. As a consequence, the decade after 2000 presented opposing views on the effects of health expenditure (both public and private) on health outcomes due to the clear-cut differences between the two. Again, some papers ignored important factors such as location and availability of certain key determinants of health such as access to good drinking water. For example, by using the two-stage least (2-SLS) squares approach for 50 developing and transition countries, Gupta, Davoodi, and Alonso-Terme (2002) concluded that public spending on healthcare improves a country's health. The use of the 2-SLS approach was meant to account for the reverse causality between public health spending and child and infant mortality rates. The researchers also found that healthcare is positively affected by per capita income, urban expansion, literacy, private spending as well as accessibility variables such as sanitation

and water. As a result, they admonished policymakers to liberally and efficiently assign resources to healthcare to enhance economic growth and improve the welfare of the poor.

Though the period after 1990 began to see the distinction between public and private health spending, the data period was scanty. As a result, some studies that endeavored to use these two parameters separately suffered from short data span which could affect the outcome of their studies.

This leads to Greenidge and Stanford (2007) using data spanning from 1994 to 2005 to verify the variables that are critical in predicting health in Latin America and the Caribbean. The authors used panel ordinary least squares approach for 37 countries. From their results, an increase in the ratio of government health expenditure to the gross domestic product, per capita calorie intake, literacy and urbanization rates improves health status as measured by life expectancy while carbon dioxide emission reduces longetivity. Measuring health status with life expectancy also presents a challenge regarding the true effect of public health expenditure on health outcomes because Anyanwu and Erhijakpor (2007) states that infant mortality generally depicts the level and the effectiveness of preventive care and the extent of attention given to maternal and child health. So if infant mortality was used as the predictor other than life expectancy, we could better determine the level of care and attention paid to health.

To improve the situation, Novignon, Olakojo, and Nonvignon (2012) estimated the effects of both public and private healthcare expenditure on health status in Sub-Saharan Africa by using both fixed and random effects panel data regression approach. Their dependent variables were life expectancy, infant mortality and death rates. They reported that aggregate health care spending reduces the infant mortality as 1 % growth in aggregate health spending result in infant

mortality declining by almost 3 infants in the fixed and random effects models. They further stated that 1% increase in public health expenditure reduces infant deaths by 4 infants while increasing the private expenditure by the same margin increases infant deaths rates by 2 infants. Again, a 1% increase in aggregate health expenditure improves life expectancy by 0.7 and 0.6 years in both fixed effect and random effect models correspondingly. But in the fixed-effect model, a 1% increase in public and private health expenditures result in 1 and 0.5 years improvement in life expectancy respectively; the effect leads to 1 and 0.4 years of improvement in life expectancy for both public and private health expenditures respectively in the random effect model. They, however, admonished policymakers to increase the amount allocated to health care delivery and as well encourage public-private partnerships in the health care delivery in the region.

Instead of using infant mortality rate proposed by Anyanwu and Erhijakpor (2007) as a true reflection of the general health situation (preventive and curative care), Akinci, Hamidi, Suvankulov, and Akhmedjonov (2014) rather used under-five death rates as one of its predictors of health outcomes. Because infant mortality is a sub-set of under-five mortality rates, the authors used under-five death rates to cater for all child mortalities. Akinci, Hamidi, Suvankulov, and Akhmedjonov (2014) used panel data for 1990-2010 to examine the effects of healthcare spending on the selected health indicators for the Middle East and North Africa countries. The researchers used pooled panel ordinary least squares, random effect and Hausman-Taylor IV methods and reported that although both public and private healthcare spending impacts on the infant, under-five and maternal mortality rates in the region, none is statistically significant. Explicitly, a percentage increase in public health expenditure decreases infant, under-five and maternal mortality rates by 8.6-9.5%, 10.3-12% and 26.0-26.3%

respectively. In like manner, a percentage rise in the log of private health spending per capita leads to 7.2-8.1%, 9.5-9.8% and 25.8-25.9% reduction in infant, under-five and maternal mortality rates respectively. Their study also revealed that while an increase in private health expenditure reduces infant, under-five and maternal mortality rates, an increase in out-of-pocket expenditure results in a slightly negative effect on infant, under-five and maternal death rates.

The findings by Akinci et al. (2014) which used panel OLS, random effect and Hausman-Taylor IV approach, is corroborated by earlier works such as Politi et al., (1995); Musgrove (1996) and Kim & Moody (1992) whom both used descriptive statistics method and also reported on the lack of statistical significance between both private and public health expenditures and health outcomes. This gave impetus to using a multivariate regression approach by Zlatko and Djesika (2015) on the subject for 14 selected countries in SSA. Their data used covered the period 2002-2014. Based on their work, public health expenditures enhance life expectancy and reduce neonatal and child death, but private health expenditures did not appear to have such a significant effect on the neonate and neonatal mortality. More so, there was no link between private health expenditure and health outcomes which is in contrast with Novignon et al. (2012) and Akinci et al. (2014). They explained the lack of relationship that, while public health expenditures are targeted at improving infrastructure, private health expenditures (mostly out-of-pocket) usually depict the presence of unofficial payments arising from inefficiencies in the health system which does not translate into health outcomes. They concluded that policymakers should, therefore, increase the amounts of funds committed to health care, the expenditure on health care must be targeted and again increase the funding on other complementary determinants of health which may have an indirect influence on health.

Contrarily, Arthur and Oaikhenan (2017) used data-sets spanning from 1995-2014 and fitted the general panel fixed effect model and found that both public and private health spending play critical roles in influencing health outcomes in the 40 SSA countries studied. Specifically, they found that public health expenditure reduces both infant (0.0768 percent) and under-five mortality rates (0.0917 percent) whiles private health expenditure also leads to 0.0289 percent improvements in life expectancy within the countries studied. They therefore admonished policymakers in SSA to deliberately increase government health expenditure to realize the gains of reduced mortalities.

To ascertain the effect of public and private health spending on child and maternal health, Ashiabi et al. (2016) just like Arthur and Oaikhenan (2017) also used panel fixed effect estimation technique albeit different data length. Ashiabi et al. (2016) used macro data spanning the period 2000-2010 where the authors used infant, under-five and maternal death rates as their measures for health outcomes. They reported that there is an inverse and statistically significant correlation between public health spending and infant and under-five mortality rates but not maternal mortality. Precisely, 1% growth in public health outlay will result in 1.6 and 1.08 per 1,000 live births reductions in both infant and under-five deaths respectively while the same percentage increase in public health expenditure will decrease maternal deaths by 0.51 per 100,000 live births. Interestingly, private health spending revealed not to be a statistically substantial predictor of health outcomes albeit the expected negative signs obtained for both infant and under-five death rates. Although neither public nor private health spending showed a significant effect on reducing maternal deaths in the 40 SSA countries studied, the effectiveness of governance in the region rather proved to be statistically significant in reducing maternal

deaths at a 10% level. Other control variables used in their study were literacy, income per capita and access to safe drinking water which all proved significant in improving health outcomes.

More recently, Nketiah-Amponsah (2019) used data from 2000 to 2015 to improve on both data coverage and the number of countries used by Ashiabi et al. (2016) to determine the impact of health spending on life expectancy, under-five and maternal mortality rates among 46 SSA countries. The report from the fixed-effect model showed that a 1% increase in health spending per capita reduces under-five and maternal deaths by 0.5% and 0.35% respectively and at the same time improves life expectancy at birth by 0.06%. Well, this finding is in contrast with Ashiabi et al. (2016) on the impact of health expenditure on maternal deaths because Ashiabi et al. (2016) disaggregated health expenditure into public and private while Nketiah-Amponsah (2019) lumped both. The author also found that while government effectiveness is statistically significant in reducing under-five deaths and improve life expectancy at 10% and 5% significance level, it has no statistical effect on reducing maternal deaths; rather, it is the regulatory quality which has a significant effect on reducing maternal deaths. The author, therefore, remarked that, although increasing health expenditure has the potential improving health outcomes, countries within SSA should pay particular attention to their peculiar health challenge so that these expenditures could wisely be channeled to specific interventions to yield the best response.

At the country level, Edeme, Emecheta, and Omeje (2017) also investigated the influence of public health spending on health status in Nigeria. They measured health with life expectancy and the rates of infant deaths while the ratio of public health spending to total health expenditure, HIV prevalence rate, urban population and gross domestic income per capita were used as the dependent variables. The authors used time-series data from 1981-2014 and OLS method and

found a long-run equilibrium association between public health spending and health outcomes. That is, a rise in public health spending will increase life expectancy at birth while at the same time reduce the infant mortality rate by 0.35%. They added that urbanization and HIV incidence rate meaningfully influence health outcomes, but, income per capita does not influence health outcomes. They continued that public health spending continues to be a basic element in improving health status in Nigeria, however, increasing public health expenditure is only a necessary condition but not in itself sufficient. Although Edeme et al. (2017) used large data set for their study, they ignored critical health inputs such as education, water and sanitation which has been widely acknowledged in the literature as being needful predictors of health outcomes. It is therefore important to have a different model where these critical health inputs would be incorporated to give more robust results.

In Ghana, Boachie (2015) likewise examined the correlation between public health spending and health position for the period 1990-2002. The authors used standard OLS and Newey-White estimation techniques for the study. They again used real income per capita, literacy and the participation of females in the labor market as control variables while health status was measured by infant mortality rate. From their study, the decreasing infant death rate in Ghana is championed by public health expenditure. Thus, they established that public healthcare spending is associated with expansion in health outcomes through a decrease in infant mortality but literacy improves health status more than health expenditure. As a result, the government should enroll programs that will increase school enrolment and completion to raise the literacy level and result in better health outcomes.

From the literature, it is quite clear that both private and public health expenditures have a positive effect on health status. But, these expenditures are not made in a vacuum as they have

been entrusted in the hands of institutions to ensure that the purposes for these expenditures are met. Perhaps, the mismatch between health outlays and outcomes in SSA is due to the presence of leakages in the form of corruption, inflated costs, misallocation of revenues spent in these sectors and low skilled staff in the sector. For example, in Ghana, Alhassan, Nketiah-Amponsah, and Arhinful (2016) assert that escalated cost is one of the main challenges that confront the National Health Insurance's continuous operation in the foreseeable future. This goes to confirm that some of the expenditure or budgeted funds committed to the health sector in the region are not accounted for.

These expenditures are not made in a vacuum but they are being greatly influenced by the kind of governance framework and institutional setups existing in the various SSA countries (Filmer & Pritchett, 1999; Nketiah-Amponsah, 2019). However, the literature has been scant (based on our search) in finding out the role that governance and institutions in SSA play in achieving the purposes of these health expenditures. Two authors, Ashiabi et al. (2016) and Nketiah-Amponsah (2019) have attempted to contribute to this subject by using a fixed effect estimation method, where both have acknowledged the contributing role of governance in realizing health expenditures.

Yet in their effort to fill the knowledge gap, Ashiabi et al. (2016) introduced the governance variable separately without interacting it with both public and private health expenditures so we could know the mediating role of governance in achieving health outcomes in the region. Although Nketiah-Amponsah (2019) endeavored to bridge that gap, the author also lumped both private and public health expenditures which prevent us from knowing how important governance is needed in mediating between both expenditures.

Again, despite efforts by previous authors in helping to appreciate the role of health expenditure in achieving health outcome, their models are confronted with endogeneity arising from using infant, under-five and maternal mortality rates as dependent variables whiles per capita income and urban population features in their models as explanatory variables (Arthur & Oaikhenan, 2017; Ashiabi et al., 2016; Greenidge & Stanford, 2007; Nketiah-Amponsah, 2019; J. Novignon et al., 2012). The lower the infant, under-five and maternal death rates, the higher the per capita income level. This means that relying on their conclusions could be problematic due to the influence of the endogeneity stated. Therefore, there is a need for studies that explicitly capture the role of governance and institutional quality in mediating between health expenditure and health outcomes.

### 3.4 Supplier-induced Demand for Health Care

Even though both public and private health expenditures have the potential of influencing health outcomes together with governance and institutions as outlined in the literature, another crucial variable – moral hazard and supplier induced demand - could greatly impact on health expenditure. This is made possible due to asymmetric information in the health sector between the patients and physicians. The patient is poorly informed about his health. As such, the physician acts as an advisor and determines the type and quality of services offered to the patient. The physician has the potential of influencing the patients number of recall visits, increase the number of laboratory tests per consultation and as well increase the number of specific procedures per consultation for his private gain, especially when the payment system available is fee-for-service (Skau, 1998)

For example, in determining the type of contract and supplier induced demand for primary physicians, Grytten and Sørensen (2001) used a data covering 1,818 and 564 for contract and salaried physicians respectively kept by the Norwegian Medical Association. The results from their OLS regression revealed that, in municipalities with high physician density, there is high competition for patients. As such, physicians in these municipalities do not increase the amount of services provided to patients. As an attempt to increase the number of services would result in physicians having less patients in their facilities.

In a similar study conducted in the Netherlands, Christel E.Van Dijk et al. (2012) used a data for 32 general practitioner practices and 33,336 consumers spanning from 2005 to 2007. The researchers used a difference-in-differences approach to study the effect of cost sharing and remuneration system on contact rates. The authors found that abolishing cost sharing in the Netherlands led to a higher increase in patient-initiated utilization for consumers who are privately insured and above the age 65. Consequently, the introduction of fee-for-service for socially insured consumers led to physicians-induced utilization of health.

In Ghana, the impoverishing effect of out-of-pocket payment system led to the introduction of prepayment system. Under the prepayment system, registered members do not have any financial obligation in accessing health care. However, a study by Ampofu (2014) exposed that, there is a high correlation between caesarean section and National Health Insurance regardless of the risk type of patient. The study used matching estimation method and was aimed at testing the presence of moral hazard in the use of caesarean section by using maternity data. The study went ahead that, pregnant women who have signed on to the National Health Insurance have twice the chance of opting for a caesarean section than their uninsured counterparts during child birth. The

author explained that this could be as a result of pressure posed by these expectant mothers on physicians as they may want to maintain their physical structure after child birth.

From the above, both moral hazard and supplier-induced demand may play an important role in determining the type and number of services a physician may prescribe to a patient. These may increase the amount of expenditure made on health care but would not translate into better health outcomes. Thus calls for the governance and institutional framework in streamlining the activities of the health sector to offer the best services to improve the welfare of the citizenry.

### 3.5 The impact of Governance and Institutional quality on health outcomes

The increasing attention of institutions and governance has been well acknowledged across the globe. This has resulted in the shift of emphasis from the neoclassical standpoint of resource endowment and technology to the 'new institutional economics' which places much emphasis on politics and institution as explaining the wide variation in economic structure and performance (Acemoglu, Johnson, & Robinson, 2001; Hausmann & Rodrik, 2003; Kraay & Kaufmann, 2002; Milgrom, North, & Weingast, 1990). Despite the growing concern on the impact of institutions and governance in an economy, less work been done in finding their role in achieving a better health outcome both in SSA and the globe at large (Ashiabi et al., 2016).

A major discernment is that efficacious growth to a large extent is contingent on political and institutional frameworks that bring in line political motivations faced by governments given the necessities of economic growth and enhanced social welfare. The closer these governmental motivations, the more probable governments are in outlining credible and sustained efforts to constructive policies and systems of public administration. In events where government

incentives are not in line with the developmental agenda, policymaking and execution become susceptible to economically hurtful political unscrupulousness. This leads to the governments placing high premiums on short term policies to amass the interest of the minority at the expense of long term policies for the masses (Alence, 2004).

Internationally, about US$3 trillion is spent on health care annually with approximately 10% as the average losses emanating from corruption. The presence of corruption sets in unfitting motivations ensuing loss of trust in public services, demotivation of health workers and poor usage of resources. The aftermath of these corrupt practices affects both the rich and the poor. The poor are affected via the unofficial payments whiles the rich are also affected through unnecessary treatments and investigations. This leads to the prescription of substandard medicines and the sale of HIV-positive blood endanger to the general community at length (Bachmann et al., 2010).

Despite the known effect between governance and development, ensuring good governance and minimizing corruption have become a global challenge. This challenge extends to the health sector due to uncertainty about future illness, information asymmetry between different actors and the complexity of the structure due to the big number of players and connections. These factors expand the risk of human errors, mismanagement and poor oversight and corruption; together, constituting poor governance (Savedoff & Hussmann, 2006). Although the exact link between poor management and corruption is not clearly understood, mismanagement can enhance corruption whiles corruption can hide behind mismanagement (Lewis, 2006).

Vian (2008) states that study into corruption related to the health sector has mainly focused on the depth of particular practices and investigation of vulnerability in specific areas. This has

resulted in less coverage of the challenge of generalized poor governance and systemic corruption due to a non-functional legal framework, particularly, where the government institution does not act in the interest of the public.

Although there are no widely agreed-upon indicators of good governance that aid in health promotion, nor has there been a significant body of research to confirm the direct relationship between good governance and health of the population, Navarro et al. (2006) have verified the relationship between political traditions, policies and public health and found that the political ideologies of the ruling political party greatly influence infant mortality and life expectancy of the population. As well, the government's policies that are geared towards reducing social inequality among the population such as labor market policies have a salutary effect on the health outcomes.

Likewise, works by the World Bank appears to confirm that countries which meet the criteria for good governance are more likely to experience lower levels of poverty. The lower level of poverty means that the population's income has improved which will aid them to afford better health systems since income has been cited as a significant determinant of health in the literature (Ashiabi et al., 2016). In Europe, Szreter (2003) states that there was an increase in the life expectancy among the populace in the 19$^{th}$ and 20$^{th}$ centuries as a result of the growing urban population who began to raise their voices to shape public policy in the distribution of social resources through their voting power. That is, when the population mounted pressure on the authorities, the right kind of leadership and governance sprang up in the health sector and resulted in an improvement of their life expectancy. This confirms the need for the right kind of governance system in mediating between both public and private health expenses in improving health.

In Nigeria, Yaqub, Ojapinwa, and Yussuff (2012) found that the presence of good governance amid public and private health expenditure decreases both infant and under-five mortality deaths while at the same time increasing life expectancy among the population. Kaufmann, Kraay, and Mastruzzi (2004) also state that governance signs such as voice and accountability, political stability and effectiveness of governance have a solid harmful impact on reducing the infant mortality rate. In their quest to contributing to the impact of governance on health outcomes, Rajkumar and Swaroop (2008) also explain that public expenditure does not yield the required outcome unless the expenditures are made amid good governance settings. This means that the quality of the expected health outcome is highly dependent on the governance system surrounding the expenditure been made. This goes a long way to confirm that governance cannot be overlooked if better health outcomes are expected as far as SSA is concerned.

Thus there is the need to investigate how governance and institutional quality can help SSA achieve better health outcomes as far as both private and public health expenditures are concerned.

### 3.6 Summary

The chapter has reviewed Grossman's human capital theory which describes the demand for health and healthcare. According to the human capital theory, health can be seen as both demand and investment goods for which reason individuals invest in themselves via education, health and training to increase their incomes. This theory has led to several empirical studies to finding how health expenditure can help in improving the health outcomes of a population.

From the reviewed literature, it is clear that both private and public health expenditure have a positive effect on health status. But, these expenditures are not made in a vacuum as they have been entrusted in the hands of institutions to ensure that the purposes for these expenditures are met. But the literature has been silent in finding out the mediating role that governance and institutions in SSA countries play in achieving the purpose of health expenditures. This gap has necessitated this study.

# CHAPTER FOUR

# METHODOLOGY

## 4.1 Introduction

This chapter discusses the methodology for examining the effect of governance and institutional quality on health outcomes. There are five sections in the chapter. The next section outlines the model specification whiles section 4.3 describes the variables to be used in the model. The preceding section (section 4.4) presents the estimation strategy. For sections 4.5 and 4.6, we look at the diagnostic tests and sources of the data respectively.

## 4.2 Model specification

This study is established on the theory of 'demand for health' promulgated by Grossman (1972) which was extended and made simple by (Wagstaff, 1986). The theory is based on three fundamental principles, which are; the indifference map, the production function and the budget constraint.

The model as used in this study is founded on the health production function concept on the theory of 'demand for health' which states that people produce health by making use of socioeconomic variables. Thus, health is a function of socioeconomic variables which is mathematically written as:

$$Health = f\left(socio-economic\ \ \text{var}iables\right) \qquad (1)$$

Given the objective of this study, we separate private and public health expenditures to enable us to know how institutions and governance mediate between the two in achieving health outcomes as shown below;

$$HO = f\left(GHE,\ \text{PHE, LAW, GOV, Z}\right) \tag{2}$$

Where $HO$ is health outcomes (infant mortality, maternal mortality and life expectancy)

$GHE$ is government health expenditure as a percentage of GDP

$PHE$ is private health expenditure as a percentage of current health expenditure

$GOV$ is government effectiveness proxied for governance level

$LAW$ is law and order proxied for institutional quality

$Z$ is a vector of control variables

In other to investigate how governance and institutional quality mediate between health spending and outcomes, we then interact the variables $LAW$ and $GOV$ with $GHE$ and $PHE$. The control variables are selected based on the literature as the key variables that influence infant mortality, under-five mortality and life expectancy at birth. The variables are the prevalence of undernourishment, urban population, sanitation, gross domestic product per capita. The model is then specified in a dynamic form as shown below:

$$HO_{it} = \beta_0 + \alpha HO_{it-1} + \beta_1 GHE_{it} + \beta_2 PHE_{it} + \beta_3 LAW_{it} + \beta_4 GOV_{it} + \beta_5 GHE_{it} * LAW_{it} + \beta_6 PHE_{it} * LAW_{it} + \beta_7 GHE_{it} * GOV_{it} + \beta_8 PHE_{it} * GOV_{it} + \beta_9 UrPOP_{it} + \beta_{10} NOR_{it} + \beta_{11} SAN_{it} + \beta_{12} PCI_{it} + \varepsilon_{it}$$

Where, $HO$, $GHE$ $PHE$ $GOV$ and $LAW$ are as previously defined,

$HO_{it-1}$ and $HO$ are the first lag and current levels of health outcomes respectively,

$GHE * LAW$, is the interaction (product) of public health spending and institutional quality,

$PHE * LAW$, is the interaction (product) of private health expenditure and institutional quality,

$GHE * GOV$, is the interaction (product) of government health expenditure and effectiveness of governance

$PHE * GOV$, is the interaction (product) of private health expenditure and effectiveness of governance

$UrPOP$, is the percentage of the population living in urban areas,

$NOR$, the percentage of the population who are undernourished,

$SAN$, is the percentage of the population with access to improved sanitation,

$PCI$, is gross domestic product per capita

$\beta_0$, is the intercept,

$\varepsilon$, is the random error term,

$it$ , refers to country i (i=1 . . . 25) at time t (t=2000 . . . 2015) and

$\beta_0 \ldots \beta_{12}$, are all coefficients.

### 4.3 Description of variables and their expected signs

#### 4.3.1 Dependent variables

*Infant mortality rate:* This is the rate at which infants die before attaining age one, per 1,000 live births in a given year. Infant mortality was selected as the measure of health outcome because it largely reveals the level of mortality and the effectiveness of preventive care and the attention paid to maternal and child health. Also, infant mortality better reflects the well-being in terms of education and income and shows the extent to which medical interventions are available, utilized and how effective it is in a country (Anyanwu & Erhijakpor, 2007). Thus, it was included to account for child health.

*Under-five mortality rate:* this is the probability per 1,000 live births that a newborn baby will die before attaining age five, if subject to age-specific mortality rates of the specified year. Much resource is provided worldwide to improve child health. As a result, under-five mortality is one of the widely used health outcomes in comparing health status and systems across nations. Thus, the inclusion was as well meant to measure child health.

*Life expectancy:* Life expectancy at birth indicates how long a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. This is also chosen as one of the dependent variables. It has been extensively acknowledged in the literature to be the valid and standard measure of aggregate health status (Nixon & Ulmann,

2006). Life expectancy was selected to account for the total health status of the countries under consideration.

### 4.3.2 Independent variables

*Public health expenditure:* Government health expenditures are made to improve the health outcomes of the citizenry. Novignon and Akanni (2017) state that public health spending is critical to improving health outcomes, thus, we expect a negative relationship with both infant and under-five mortality rates but positive with life expectancy.

*Private health expenditure:* this is the private health expenditure as a percentage of current health expenditure. It is comprised of direct household expenditure, charitable donations, private insurance as well as direct service payments made firms (Unicef, 2012). Private health spending measures the quantum of resources from households and corporations that go into health and supplements public health spending in the advancement of health. We, therefore, expect a direct relationship between private health expenditure and health status. An increase in private health expenditure is projected to impact negatively on infant and under-five mortality rates but positively on life expectancy.

*Improved Sanitation:* Factors such as sanitation and air quality have similarly important influence on health. Cleanliness in the environment decreases the outbreak of communicable diseases, thus reducing mortality. In the event of an outbreak of communicable disease, pregnant/lactating mothers and children become most susceptible. Hence, ensuring good environmental conditions aid in eliminating the outbreak and spread of diseases which then goes a long way to reduce infant and under-five death rates. In this study, we use the ratio of the

population with access to improved sanitation as a proxy for environmental cleanliness. Access to improved sanitation facilities, therefore, refers to the ratio of the population having access to at least adequate excretal disposal facilities which can sufficiently eliminate human, animal and insect contact with excreta, ranging from simple but protected pit latrines to flush toilets with sewerage connection (World Bank 2012). Therefore, we expect an inverse relationship between sanitation and both infant and under-five mortality but a direct relationship with life expectancy.

*Urbanization:* Regarding urbanization, which is the percentage of the population who live in urban areas, in these urban localities, getting access to health facilities is considerably easier than the rural counterpart and connected to improved health status (Greenidge & Stanford, 2007; Schultz, 1993). Thus, we expect urbanization to have a negative relationship with infant mortality as well as under-five mortality in this model as presented by Greenidge and Stanford (2007) and Schultz (1993) but positively relate with life expectancy. This was included as an accessibility variable for determining health.

*Governance and institutional quality:* According to Wagstaff and Cleason (2004), the degree to which government health expenditure promotes health status is highly dependent on the extent to which policies and institutions are effective. In defining institutions, we use Douglas North's definition which states that institutions are those formal and informal rules of procedures and their accompanying enforcements (North, 1991).

The International Country Risk Guide (ICRG) has identified six different indicators as a way of measuring the quality of governance in various countries across the globe. Political Stability, Government Effectiveness, Rule of Law, Voice and Accountability, Absence of Violence and Control of Corruption are the various indicators proposed by the ICRG. This study uses

government effectiveness and rule of law as the measure for governance and institutional quality. They are both measured on a scale from -2.5 to 2.5; where -2.5 represent bad governance effectiveness and non-conformance with the rule of law while 2.5 show government effectiveness and total compliance with the rule of law. Due to the negative involved in their measure, we add a factor of 6 to both governance and rule of law variables eliminate the negative without altering their statistical effects (Pinzon-Rondon, Attaran, Botero, & Ruiz-Sternberg, 2015). Kaufmann, Kraay, and Mastruzzi (2003) state that the rule of law measures the amount of confidence which people have regarding societal rules, particularly the extent of quality contract enforcement, property rights, courts, police as well as the possibility of violence and crime. This study uses the rule of law because it stresses much on institutional frameworks and how the institutions function. Of course, it is out of the vibrancy of this institution that good governance can emerge. In countries where quality institutions and governance prevail, all agents will be operating within their confines and adhere to the principle of rule of law, thus, it will lead to growth and development in all aspects including better health outcomes (Boettke & Subrick, 2003). Therefore, we expect the rule of law to reduce both infant mortality and under-five mortality rates and increase life expectancy.

Also, the study uses government effectiveness as another indicator for good governance and institutional quality stems from the fact that government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. So the degree to which policies are been formulated and implemented devoid of any political pressure largely determines the quality of the governance system in a country. As a result, infant and maternal mortality rates will reduce to

their barest minimum and increase life expectancy due to the quality of the policies to be formulated and obeyed. Hence, we expect an inverse relationship between rule of law and government effectiveness and both infant and under-five mortality rates and a direct relationship with life expectancy.

*Prevalence of undernourishment:* this refers to the ratio of the population whose nutritional intake is below the expected dietary energy consumption. About 25% of children in emerging economies are faced with the problem of underweight and stunted growth while globally, about 35% of child deaths are attributed to undernutrition (Bank, 2012). This variable was added to control for the impact of nutrition on health outcomes. Hence, expect that the more people are undernourished, the likelihood of both infant mortality and under-five mortality increasing while life expectancy at birth reduces. Thus, a positive relationship is expected between both infant mortality and under-five mortality rates but negatively related to life expectancy.

*Gross domestic product per capita:* There are several studies such as Musgrove (1996); Gupta et al. (2002); Buor and Bream (2004) and Issa and Ouattara (2005)which suggest that the health of the population is improved as the per capita income of a nation rises. This clarifies that GDP per capita is very critical to determining health status. GDP per capita is the ratio of gross domestic product (measured at a constant price) to the total population. According to Verhoeven, Gupta, and Tiongson (1999), an increase in per capita income leads to an improvement in the health status of the population. This is because, an increase in per capita income increases governments' and firms' abilities to produce better health facilities which will enhance health care. As a result, GDP per capita was included to account for income as a determinant of health. Thus, we expect an inverse relationship between per capita income and infant and under-five mortality rates but a direct relationship with life expectancy.

**Table 4. 1: Summary of variables and their expected signs**

| Variable | IMR | U5MR | LE |
|---|---|---|---|
| GHE | Negative (-) | Negative (-) | Positive (+) |
| PHE | Negative (-) | Negative (-) | Positive (+) |
| LAW | Negative (-) | Negative (-) | Positive (+) |
| GOV | Negative (-) | Negative (-) | Positive (+) |
| GHE*LAW | Negative (-) | Negative (-) | Positive (+) |
| PHE*LAW | Negative (-) | Negative (-) | Positive (+) |
| GHE*LAW | Negative (-) | Negative (-) | Positive (+) |
| PHE*GOV | Negative (-) | Negative (-) | Positive (+) |
| PCI | Negative (-) | Negative (-) | Positive (+) |
| UrPOP | Negative (-) | Negative (-) | Positive (+) |
| SAN | Negative (-) | Negative (-) | Positive (+) |
| NOR | Negative (-) | Negative (-) | Positive (+) |

Source: Author's compilation

### 4.3 Estimation strategy

The presence of potential endogeneity with the model introduces a challenge in using OLS to estimate the model as it will be inconsistent and biased. Although there exist other estimation techniques in dealing with the endogeneity problem, the dynamic panel model remains best using the Generalized Method of Moment (GMM) estimation technique because of its ability to deal with the dynamic panel bias problem arising from the endogeneity.

The use of Instrumental Variable (IV) and Two-Stage Least Squares (2SLS) estimates are important procedures that could be used to estimate the model. However, both techniques make use of external instruments. The problem with using external instruments is that usually, they are

weak and could hardly fulfill the requirements of "validity and relevance" yield an unbiased estimate (Blundell & Bond, 1998). Again, there arise difficulties in obtaining instruments which are correlated with the endogenous variables whiles it is uncorrelated with the stochastic error terms. This situation makes the GMM technique a preferable choice since it makes use of the lags of the endogenous variables as the instruments. Thus, the endogenous variables are predetermined and uncorrelated with the error terms.

According to Blundell and Bond (1998), system GMM as used in this study uses an assumption about the initial conditions to gain moment conditions that are informative for even persistent series and shown to perform well in simulations. As well, Bertenshaw et al. (2001) show that the system GMM estimator is the preferred approach for estimation of empirical growth models based on its superior capacity in developing stationarity restrictions and again appears to give more reasonable results.

### 4.4 Diagnostic tests

#### 4.4.1 Stationarity (Unit Root) Test

Undertaking Unit Root tests in panel dataset is critical in avoiding the problem of spurious regression estimates which transmits from the incidence of unrelated regressions. Gujurati and Porter (2008) state that "a stochastic process is said to be stationary if it's mean, and variance are constant over time and the value of covariance between two periods depends only on the distance between the two periods and not on the actual time at which the covariance is computed". Thus, the study employs the Fisher test. As stated by Choi (2001), the Fisher test is preferred due to the following details:

- It does not require a balanced panel as in the case of the Im- Pesaran and Shin (IPS) test
- Different lag lengths can be used in the individual Augmented Dickey–Fuller (ADF) regressions.
- It can be carried out for any unit root test.
- It does not require simulating adjustment factors that are specific to the sample size and specification.

Choi (2001) states that when the number of the panel is finite, the inverse chi-squared test becomes very suitable and commanding tool for analyzing stationarity. Since this study involves finite panel data, we use the inverse chi-squared as the rule of thumb for the evaluation.

### 4.4.2 Endogeneity

Equation 3 is likely to suffer from the problem of endogeneity. This will render the OLS estimates to be biased and inconsistent. Endogeneity is said to occur when there is a correlation between an explanatory variable and the error term or there is reverse causality. To help confirm the presence of the endogeneity, a Durbin-Wu-Hausman test would be performed on the residuals of all the variables. Then, we use the system GMM procedure to cater for the endogeneity.

### 4.4.3 Heteroskedasticity

In econometrics, the problem of heteroskedasticity is said to occur when the variance of the error terms differ for all observations. Gujurati and Porter (2008) explain that incorrect data transformation, outliers in variables, incorrect functional forms and the omission of important

variables affect the variance of the error terms of the dependent variables causing it not to be constant. The white test will be used to detect for the presence of heteroskedasticity and will be corrected using robust standard errors.

### 4.4.4 Multicollinearity

Multicollinearity is said to occur when there is a relationship between two or more independent variables in a regression model. Two types of multicollinearity are noted in the literature: Perfect and Imperfect multicollinearity. Multicollinearity is said to perfect when one of the regressors is a perfect linear combination of the other regressors, whiles it is imperfect when one of the regressors is high but not correlated perfectly with other regressors. Factors such as data collection method, over-determined model and model specification among others are the causes of multicollinearity. Although OLS estimators are linear, best, efficient and unbiased in the presence of multicollinearity, their variances and covariances become larger leading to difficulty in making precise estimations. This results in making the t-ratio of one or more coefficients becoming statistically insignificant with a very high R-squared. Though several ways can be used to identify the presence of multicollinearity such as auxiliary regressions, correlation matrix, eigenvalues and condition index, this study uses the variance inflation factor (VIF). A VIF of less than 10 will be considered appropriate as stated by (Kleinbaum, Kupper, Muller, & Nizam, 1988).

### 4.5 Sources of Data

The governance and institutional quality data set was obtained from the government effectiveness and rule of law component of the International Country Risk Guide (ICRG) whiles the remaining data on both dependent and control variables were sourced from the World Bank's World Development Indicators spanning from the period 2000-2015 for 22 SSA countries. The countries were selected due to data availability. Countries in the region that do not have data for any of the dependent variables, as well as the variables of interest, were not included. Similarly, countries without data for more than one of the control variables were also dropped.

### 4.6 Summary

The study uses the system GMM estimation technique to achieve its purpose. Diagnostic tests such as multicollinearity, endogeneity, heteroskedasticity and unit root tests would be performed while data will be sourced from WDI and ICRG. Infant, under-five mortality and life expectancy are the health outcome variables to be employed as well.

# CHAPTER FIVE

# RESULTS AND DISCUSSION

## 5.1 Introduction

The study covers twenty-two (22) SSA countries spanning the period 2000-2015. StataCorp's statistical package version 14 (STATA 14) was used for the computation of the empirical estimations. The present chapter contains four sections. The next section, 5.2, describes the variables used, followed by section 5.3 which contains results for some of the diagnostic tests performed. Section 5.4 and 5.5 contain the empirical findings and conclusions respectively.

## 5.2 Summary statistics

**Table 5.2. 1: Summary statistics of variables**

| Variable | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|
| Life expectancy (LEB) | 57.43 | 5.59 | 46.02 | 72.60 |
| Under-five Mortality Rate (U5MR) | 98.52 | 37.59 | 22.20 | 206.50 |
| Infant Mortality Rate (IMR) | 61.86 | 19.79 | 18.90 | 115.80 |
| Public health expenditure (GHE) | 33.15 | 16.35 | 7.41 | 73.00 |
| Private Health Expenditure (PHE) | 48.28 | 16.23 | 16.85 | 84.52 |
| Rule of law (LAW) | 5.15 | 6.411 | -104.00 | 6.73 |
| Government effectiveness (GOV) | 4.80 | 6.96 | -86.00 | 6.99 |
| Per Capita Income (PCI) | 3190.25 | 3334.27 | 77.91 | 15914.67 |
| Sanitation (SAN) | 30.65 | 18.20 | 3.64 | 73.13 |
| Nourishment (NOR) | 21.95 | 13.68 | 4.30 | 65.30 |
| Urban population (UrPoP) | 35.70 | 16.18 | 2.69 | 65.53 |

Source: Author's Computations Using STATA 14.

With the exception of Uganda which did not have data on U5MR for the year 2000, all the countries had data on all the variables. The average values for the dependent variables are 61.86, 98.52 and 57.43 for infant, under-five mortality and life expectancy respectively. The minimum values for both private and public health expenditures were 16.85 and 7.41 with their maximum values as 84.52 and 73.00 respectively. LAW had a mean value of 5.15 and a standard deviation of 6.41 whiles GOV had an average value of 4.80 and a standard deviation of 6.96. Data on LAW and GOV for the year 2001 was not available for all the countries. Table 5.2.1 shows that 4.30 and 65.30 are the minimum and maximum values for NOR respectively. This shows that some countries within SSA are not receiving the best amount of nutrition compared to others while the minimum and maximum values of 2.69 and 65.53 respectively representing UrPOP shows that the rate of urbanization is very high in some SSA countries than others.

## 5.3 Diagnostic tests

### 5.3.1 Unit root test

The outcome from the unit root Fisher-type (stationarity) test for the set of variables in the model is shown in table Table 5.3.1 with a null hypothesis that the variables have no unit-roots. The four unit root tests are reported. As indicated by Choi (2001), when the number of the panel is finite, the inverse chi-squared test becomes a very suitable and commanding tool for analyzing stationarity. Thus, given the finiteness of this panel, the null hypothesis of stationarity is hence rejected among all the variables for the inverse chi-squared test. More so, the inverse logit and modified inverse chi-squared tests all confirmed the validity of the inverse chi-squared test,

however, PCI was not significant for the inverse normal test. In summary, the panels do not contain unit roots; hence, there is no tendency for any spurious or unrelated regressions.

**Table 5.3. 1 Fisher–Type Stationarity (Unit Root) Test**

| | Inverse chi-squared | | Inverse normal | | Inverse logit t | | Modified inv. chi-squared | |
|---|---|---|---|---|---|---|---|---|
| Variable | Statistic | Prob | Statistic | Prob | Statistic | Prob | Statistic | Prob |
| PCI | 116.3958 | 0.0000 | -0.1631 | 0.4352 | -2.5599 | 0.0058 | 6.6396 | 0.0000 |
| PHE | 90.0525 | 0.0004 | -1.9631 | 0.0248 | -2.8753 | 0.0024 | 4.0052 | 0.0000 |
| GHE | 153.1308 | 0.0000 | -4.4208 | 0.0000 | -6.4172 | 0.0000 | 10.8106 | 0.0000 |
| GOV | 78.2110 | 0.0011 | -2.2542 | 0.0121 | -2.4772 | 0.0074 | 3.6469 | 0.0001 |
| LAW | 129.8973 | 0.0000 | -4.2556 | 0.0000 | -5.6645 | 0.0000 | 9.1567 | 0.0000 |
| SAN | 100.8971 | 0.0000 | -0.5681 | 0.2850 | -3.1299 | 0.0012 | 5.0897 | 0.0000 |
| U5MR | 331.1325 | 0.0000 | -9.7937 | 0.0000 | -16.4772 | 0.0000 | 28.8971 | 0.0000 |
| IMR | 231.3319 | 0.0000 | -4.6219 | 0.0000 | -9.7621 | 0.0000 | 18.1332 | 0.0000 |
| UrPOP | 105.8898 | 0.0000 | -0.5294 | 0.2983 | -3.4245 | 0.0005 | 6.5975 | 0.0000 |
| LE | 1395.7610 | 0.0000 | -33.1758 | 0.0000 | -77.1407 | 0.0000 | 134.5761 | 0.0000 |

Source: Author's Computations Using STATA 14.

### 5.3.2 Heteroskedasticity Test

The Breusch–Pagan / Cook-Weisberg test for heteroskedasticity was performed to test for the existence of heteroskedasticity in both equations. The results rejected the null hypothesis of constant variance at a 1% significance level for all the equations indicating the presence of heteroskedasticity (see tables 5.3.2).

**Table 5.3. 2 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

| | | |
|---|---|---|
| Null Hypothesis: Constant variance | | |
| Output for IMR | chi2(9)= | 337.86 |
| | Prob >chi2 = | 0.0000 |
| Output for LE | chi2(9)= | 126.28 |
| | Prob > chi2 = | 0.0000 |
| Output for U5MR | chi2(9)= | 75.49 |
| | Prob > chi2 = | 0.0000 |

Source: Author's Computations Using STATA 14.

This situation means that using the OLS method of estimation would not produce consistent estimates, thus lead to misleading and unreliable results. Using the system GMM approach is therefore able to produce consistent and unbiased estimates.

### 5.3.3 Multicollinearity Test

A test for multicollinearity was performed on all the regressors. The outcomes from the test are shown in Table 5.3.3.

**Table 5.3. 3 VIF test for multicollinearity for the regressors**

| Variable | SAN | PCI | GHE | PHE | UrPOP | NOR | LAW | GOV |
|---|---|---|---|---|---|---|---|---|
| VIF | 2.47 | 2.46 | 2.17 | 1.94 | 1.91 | 1.17 | 1.04 | 1.03 |

Source: Author's Computations Using STATA 14.

As a rule of thumb provided by (Kleinbaum et al., 1988), the VIF of each of the variables is less than 10 indicating non-severity of multicollinearity. See Appendix 3 for the correlation matrix.

### 5.3.4 Endogeneity

The study has employed the Durbin-Wu-Hausman (DWH) test to test for potential endogeneity in the model. The test was performed on the residual of the variables. Based on the Durbin-Wu-Hausman (DWH) test, the report on the variables that proved to be endogenous are showed in Table 5.3.4.

**Table 5.3. 4 Durbin–Wu–Hausman (DWH) Test for Endogeneity**

| Null Hypothesis | P-value (Prob > Chi2) |
|---|---|
| PCI | 0.0000 |
| PHE | 0.0250 |
| GHE | 0.0345 |
| UrPOP | 0.0024 |
| GOV | 0.0001 |
| LAW | 0.0001 |

Note: The residuals of the variables are predicted and tested for significance after regressing them on all the other exogenous variables.

Source: Author's Computations Using STATA 14.

Table 5.3.4 shows that PCI, PHE, GHE, UrPOP, GOV and LAW are endogenous. Thus, they are specified in the GMM for their respective dependent variables with which they are endogenous.

### 5.4 Discussion of Results

The study used the system GMM estimation technique to ascertain how governance and institutional quality impact on public and private health expenditure. For comparison purposes, we also estimated the fixed effect (see Appendix 2) model but their coefficients are not significantly different. Health outcomes considered in the model are infant and under-five mortality rates and life expectancy.

The coefficients from the multicollinearity test showed no high correlation existing between the variables while the heteroskedasticity test rejected the null hypothesis of constant variance for all the equations. However, the endogeneity test revealed that rule of law, government effectiveness, income per capita, private as well as public health expenditure are endogenous with infant and under-five mortality rates. Conversely, only urban population, private and public health expenditures were revealed to be endogenous with life expectancy. Also, the inverse chi-squared test showed that none of the variables have a unit root at a 1% level of significance.

The results from Table 5.4.1 revealed that public and private health expenditures have a positive and significant effect on infant and under-five mortality and at the same time have negative and significant effects on life expectancy. Similarly, the rule of law has a negative and significant effect on life expectancy but a direct and significant relationship with both infant and under-five mortalities. However, government effectiveness does not have a significant effect on both infant mortality and life expectancy but it showed a positive and significant effect on under-five

mortality. Concerning the interacted variables (variables of interest), Table 5.4.1 shows that holding both public and private health expenditure constant, the presence of rule of law has a negative and significant effect in reducing infant mortality and under-five mortality and is positively significant in increasing life expectancy. Similarly, holding public health expenditure constant, government effectiveness has a negative and significant effect in reducing under-five mortality. However, with constant private health expenditure, government effectiveness does not have a significant impact on health outcomes although the result revealed negative effects on both infant mortality and under-five mortality and positive effect on life expectancy. Table 5.4.1 also shows that the percentage of the population with access to improved sanitation services and nourishment has a significant influence on health outcomes. Both per capita income and urbanization showed positive and significant effects on infant and under-five mortality but urbanization does not have a significant effect on life expectancy.

Our results further reveal that increasing public health expenditure will lead to infant and under-five mortality rising and reduce life expectancy. This is because, Berger and Messer (2002) state that the more countries increase their public health outlay, they tend to decrease their expenditure on other publicly finance projects. These projects may also have an indirect impact on determining health outcomes. All factors held the same, as public health expenditure on building hospital facilities and provision of essential drugs increases; it will result in less expenditure on the provision of good drinking water and improved road networks and others which have a great impact on determining health. Ahmad and Hasan (2016) also state that due to inefficiencies associated with public expenditure and governance and the absence of infrastructure needed to access health, rising public health expenditure will not yield improvements in health.

**Table 5.4. 1 GMM estimates**

| VARIABLES | (1)<br>IMR | (2)<br>U5MR | (3)<br>LEB |
|---|---|---|---|
| L.IMR | 0.0540*** | | |
| | (0.0102) | | |
| GHE | 15.52*** | 1.172*** | -0.173*** |
| | (1.210) | (0.0739) | (0.0594) |
| PHE | 8.436*** | 0.773*** | -0.205*** |
| | (1.046) | (0.0581) | (0.0563) |
| LAW | 171.8*** | 13.94*** | -3.414*** |
| | (18.40) | (1.059) | (0.950) |
| GOV | 1.335 | 0.552** | -0.0891 |
| | (2.277) | (0.265) | (0.0782) |
| GHE*LAW | -2.829*** | -0.203*** | 0.0293*** |
| | (0.213) | (0.0139) | (0.0107) |
| GHE*GOV | -0.0217 | -0.00930** | 0.00132 |
| | (0.0352) | (0.00404) | (0.00121) |
| PHE*LAW | -1.610*** | -0.135*** | 0.0362*** |
| | (0.188) | (0.0107) | (0.00990) |
| PHE*GOV | -0.0111 | -0.00458 | 0.00105 |
| | (0.0246) | (0.00294) | (0.000846) |
| PCI | 0.00182*** | 0.000100** | 5.65e-05*** |
| | (0.000442) | (4.52e-05) | (2.02e-05) |
| SAN | -0.744*** | -0.137*** | 0.00463 |
| | (0.0665) | (0.00674) | (0.00419) |
| UrPOP | 0.845*** | 0.0976*** | -0.00246 |
| | (0.0738) | (0.00638) | (0.00301) |
| NOR | -0.493*** | -0.102*** | 0.0147*** |
| L.U5MR | | 0.879*** | |
| | | (0.00417) | |
| L.LEB | | | 1.065*** |
| | | | (0.0329) |

Standard errors in parentheses

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

As well, Politi et al., (1995) state that public health expenditure does not take into consideration the finance of complementary determinants of health. However, this finding is in contrast with Ashiabi et al. (2016), Edeme et al. (2017) and Arthur and Oaikhenan (2017) who both found that public health spending reduces infant and under-five mortality and improves life expectancy.

Just like public health expenditure, increasing private health expenditure will as well result in infant and under-five deaths rising and at the same time lead to a reduction in life expectancy as far as SSA is concerned. This result is supported by earlier work by Novignon et al. (2012) who also stated that private health expenditure increases infant mortality. This result is expected since Zlatko and Djesika (2015) state that in SSA, private health expenditure normally reveals inadequacies in the health system and comprised of unofficial payments which do not go into the production of health. Again, the direct relationship between private health expenditure and infant and under-five mortality could be resulting from supplier induced demand by the health care providers. The physicians over-prescribe treatments to patients which increase their expenditure but do not translate into the betterment of their health. For instance, Amporfu (2014) informs that, Ghanaian pregnant women who have health insurance have a greater chance of undertaking caesarean section during child birth than they probably would if they didn't have health insurance. Alran, Sibony, Oury, Luton, and Blot (2002) explain the phenomenon that it is supplier induced demand which leads to this situation. This increases private health expenditure without the expected effect on health outcomes, thus, the direct relationship between private health expenditure and infant and under-five mortality rates.

Hence, the more private health expenditure increases, it will lead to undesired consequences on health outcomes. Our finding is not confirmed by earlier works such as Akinci et al. (2014) and Arthur and Oaikhenan (2017) who found that private health spending increases life expectancy

and reduces infant mortality in SSA. Failure to cater for the endogeneity between private health expenditure and infant mortality could be the reason for the contrasting view between this study, Akinci et al. (2014) and Arthur and Oaikhenan (2017).

With regards to government effectiveness and rule of law variables, Table 5.4.1 shows that these variables have detrimental consequences on health outcomes. This explains the level of interest and participation by the populace in SSA in shaping public policy and governance given their levels of income and education. For example, Wise (2007) outlines that the higher the income status and educational level of families, the greater the likelihood of those household members participating in policies and public decision-making process that are likely to have a good influence on health. Hence, the low levels of income and high illiteracy rate in the region pushes majority of the citizens to be unconcerned about the kind of governance and rule of law, as a result, the few who make these laws do not care much about the future consequences of the laws that they make and their implementation processes because they feel not accountable to anyone due to the less participation by the members. As well, the frequent strikes of war and conflicts in the region stemming from less effective governance system and non-conformity to rule of law have attenuated the less development and poor health outcomes (Fosu, 2017). Thus, fewer quality laws leading to the direct relationship between these indicators (governance and rule of law) and infant mortality and under-five mortality and the indirect correlation with life expectancy.

Concerning our key variables, the interacted variables, the results reveal that their mediating role in influencing health outlay is very significant in predicting health outcomes. Precisely, holding both public and private health expenditure constant, good institutions, proxied by rule of law is very critical in reducing both infant and under-five mortality and increase life expectancy. That

is, rule of law elevates the efficacy level of public health spending by reducing infant mortality and under-five mortality by 2.8 and 0.2 per 1,000 live births respectively and at the same time has the capacity of increasing life expectancy by 0.03 years. Likewise, the mediating influence of rule of law leads to private health expenditure resulting in 1.6 and 0.4 per 1,000 live births reduction in infant mortality and under-five mortality respectively and 0.04 years of advancement in life expectancy. This result further shows that to reduce infant and under-five mortality amid defined health expenditure, the prevalence of good institutions will aid in public health expenditure yielding the best result than private. However, in achieving a greater life expectancy given the same expenditure patterns, good institutions will ensure that private health expenditure springing up the best response. These results show that good institutions are key in achieving better health outcomes given constant health expenditure. Thus, without adequate institutional capacity, Berger and Messer (2002) state that any attempt by the government to increase public health expenditure will result in greater mortalities. Likewise, Pinzon-Rondon et al. (2015) also emphasized that institutions play a critical role in mediating between health spending and health outcomes other than any variable capable of determining health outcomes.

Also, the arbitrating role between government effectiveness and health outlay (both public and private) and health outcomes shows that there is a statistically significant mediating role between public health spending and reduced under-five mortality. It further shows that the mediating role of government effectiveness on private health spending and outcome is not statistically substantial in achieving reduced infant mortality and under-five mortality and increased life expectancy. This results show that the influence of governance in aiding private health expenditure to gain their intended motive is not significant. This is likely to be the result of the poor governance score by most countries within the region and frequent conflicts in the region.

For example, Yaqub et al. (2012) posit that the presence of good governance amid private health expenditure reduces infant and under-five mortalities while at the same time increasing life expectancy among the population. Perhaps, the level of governance system prevailing in SSA is have not climbed to the point where it can offer an effective mediating role on private health expenditure and outcomes.

Again, our findings show that the delivery of quality health care is highly dependent on profound policies and administrative institutions. Quality governance is essentially needful if health expenditure will achieve their intended purposes and strengthens the link between health outlay and outcomes (Makuta & O'Hare, 2015). In the same vein, Sterck, Roser, Ncube and Thewissen (2018) outlines that good governance and institutional quality must prevail for donor funds aimed at improving health care services to realize their goals. Thus, enhancement in the quality of governance ensures better targeting while at the same time lead to an efficient allocation and utilization of the health resources.

Our results further state that the influence of the rule of law in achieving the purposes of health expenditure is more pronounced than the governance system. Of course, in economies where rule of law permeates, there is the absence of violence and conflicts which work against the governance system in that economy. Thus, all social institutions thrive based on their rules of engagements that define its operation (North, 1991). Consequently, if SSA countries want to realize the benefits of their health outlays, they must adhere to the principle of rule of law since its mediating role between health expenditure and outcomes exceeds the mediating role of effective governance.

For the control variables, nourishment proved to be a significant determinant of health. That is, when 10 people in the undernourishment bracket leaves, it results in infant mortality reducing by 49 per 1,000 live births while it will increase life expectancy by 1.5 years. This finding is in contrast with Arthur and Oaikhenan (2017) who found an insignificant relationship between undernourishment and health outcomes although the expected signs were obtained. This result means that countries in SSA should endeavor to be food secured for their citizens to obtain the required nutritional intake.

Also, our findings show that environmental issues are significant determinants of health. Particularly, when the number of the population with access to improved sanitation services increases, there is a corresponding reduction in infant mortality and under-five mortality by 7 and 1 per 1,000 live births respectively albeit insignificant in increasing life expectancy. Adequate sanitation improves health outcome, therefore, it is important for SSA countries to address their sanitation challenges to achieve better health outcomes.

Similarly, our results went on to reveal that urbanization harms health indicators. The more communities become urbanized, they lead to increases in infant and under-five mortality rates. As explained by Akanni (2012) that a high urban population result in pressure on the health care facilities and a high patient to physician ratio but leaves the health facilities at the rural area non-functional either due to non-availability of modern facility and lack of personnel to man the facility or the preference of the rural dwellers for urban health centers. Also, WHO and UNICEF (2012) outlines that, as cities become urbanized where opportunities, jobs and services are concentrated, they as well lead to concentrated health hazards to which people become more exposed to. This is more pronounced in developing countries especially SSA where there abound poorly planned or unplanned urban housing, transport, and food systems, along with social and

lifestyle factors which are drivers for the spread of non-communicable diseases, which are linked to risks and hazards such as air pollution, poor diet, physical inactivity, traffic injury and domestic injury. It is, however, needful for the health facilities in the urban areas to be enlarged to cater for the growing urban population and ensure high utilization rate.

Although we expected income to aid in decreasing infant and under-five mortality, our finding shows that per capita income has a direct influence on infant and under-five mortality. Although income showed a positive impact on life expectancy, the coefficient is almost negligible. This result means that as income levels increase, its effect on increasing life expectancy is very minimal. This is explained by Dayanikli, Gokare, and Kincaid (2016) that the impact of gross domestic product per capita on life expectancy is not direct. This is because gross domestic product per capita affects life expectancy to a certain threshold; beyond that maximum point, their impact on life expectancy is very minimal. According to Flegg (1982) and Brook et al. (1979), there are higher rates of child mortalities in economies where there are unequal income distributions. Considering SSA with higher income inequalities, only a minority makes significant contributions to the gross domestic product. As a result, gross domestic product per capita may be increasing but child mortality may be increasing as well because the majority may not have the resources to afford health care. Hence, the positive relationship between per capita income, infant mortality and under-five mortality.

### 5.4 Summary

This chapter has analyzed the mediating role of governance and institutional quality in achieving the purposes of private and public health expenditures in SSA. The results show that private and

public health expenditure in their own capacity, does not improve health outcomes. However, when they are mediated by quality institutions and effective governance system, they have significant effect on improving health outcomes in SSA. This means that countries in SSA should make continuing efforts to improve the governance and institutions to realize the benefits of health expenditure.

# CHAPTER SIX

# SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

## 6.1 Introduction

This is the final chapter of the study. The chapter is made of four sections: the next section, 6.2 contains the summary and conclusions whiles section 6.3 outlines the policy implications arising from the study. The final section, 6.4 outlines the limitations and areas for further studies.

## 6.2 Summary and Conclusions

The importance of health expenditure in attaining better health outcomes is well established in the literature. This has resulted in many governments in different regions, including Sub-Saharan Africa committing significant proportions of their incomes to health care provision. Even though the amount of income committed to health care provision in SSA is not comparable to other regions such as the Americas and the Europeans, it exceeds that of South-East Asia and the Eastern Mediterranean. In spite of this, SSA continues to be the region with the least health outcomes. This could be as a result of leakages, mismanagement of funds and employment of less qualified personnel in the health sector. This worrying situation gave birth to this work to ascertain how effective governance system and quality institutions could influence these health expenditures in achieving better health outcomes in the region. These health outlays do not operate on their perils. Rather, they are greatly influenced by the governance system and institutional frameworks pertaining in the economies where the expenditures are made.

The study used data from the World Bank's world development indicators. The data covered the period 2000 to 2015 for 22 SSA countries. This research used the system generalized method of moment estimation procedure to arrive at the objective of the work and compared the results with the fixed effect technique. The system generalized method of moment approach overcomes the estimation challenges which are commonly associated with some estimation procedures such as the OLS, IV and the traditional panel estimations.

The diagnostic checks revealed no high correlation between the variables. However, the endogeneity test proved that private and public health spending, rule of law, government effectiveness and gross domestic product per capita are endogenous with infant mortality and under-five mortality while only private health expenditure, public health expenditure and urban population showed to be endogenous with life expectancy.

The results from the study disclosed that, both public and private health outlays, rule of law and government effectiveness are significant and positively related with infant mortality and under-five mortality but negatively correlated with life expectancy. This finding means that these variables in their capacity cannot have a positive impact on reducing infant mortality and under-five mortality and increase life expectancy at birth but needs an intermediary to realize their objectives.

The study further shows that, rule of law, proxied by institutional quality and government effectiveness also proxied by good governance system are essential ingredients in mediating between public and private health payments and health indicators if governments in Sub-Saharan Africa wants to achieve better health. Particularly, when health expenditures are made in economies where quality institutions prevail, they result in greater reductions in infant and

under-five mortalities than economies with good governance system. Even though when both private and public are mediated by rule of law leads to increases in life expectancy, our finding shows that when private health expenditure is made in countries with adequate supervision and adherence to rule of law, the influence of the rule of law on private health expenditure in increasing life expectancy is higher than the influence of rule of law on public health expenditure increasing life expectancy.

Relating to the control variables, access to good sanitation services nourishment showed to be a significant determinant in reducing both infant and under-five mortality while at the same increasing life expectancy. This makes it needful for governments in Sub-Saharan Africa to ensure that they deal with the sanitation challenges in the region to enhance the health outcomes of the citizenry. In addition, urbanization which represents the percentage of the total population who are living in urban areas revealed that, urbanization has detrimental effects on the health outcomes. The increasing urbanization in region poses much pressure on the few health facilities in the urbanized areas leading to poor health in the urbanized areas.

Precisely, this study has shown that the mediating role of governance and institutional quality are highly important in achieving the purposes of health expenditure. Essentially, private and public health expenditure cannot meet their intended purposes of reducing infant and under-five mortality unless they are mediated by good governance and quality institutions. These findings also suggest that political stability is contingent on institutional quality.

### 6.3 Policy Recommendations

Given the outcome from this study, governance and institutions in SSA should be strengthened by providing clear cut policies on rules and procedures to be used in achieving the purposes of private and public health expenditures as well as mechanisms needed to evaluate expected results from the expenditures made. This again involves reducing corruption and empowering management of the various institutions in charge of health with the needed resources and authorities to perform their expected function.

Also, because governance and rule of law have different effect in their mediating role on health spending and outcome, policy makers should select the right combination to yield their best response. Given a constant private and public health expenditure, our results shows that the presence of good institutions aid in public health expenditure reducing infant mortality and under-five mortality more than private health expenditure. Conversely, institutional quality mediates private health expenditure to increase life expectancy higher than public health expenditure. Thus, policy makers should endeavor to determine the maximum level of these expenditures to be mediated by institutions to reduce waste and yield the best outcomes.

Also, availability as well as access to good sanitation services has a greater bearing in improving health outcomes. Hence, governments in Sub-Saharan Africa should put up laws to address their sanitation challenges in order to increase their life expectancies and reduce child mortalities. Urbanization is increasingly becoming a major challenge to African countries and their associated health demands. As a result, government in SSA should make available basic social amenities such as roads, markets and schools in the rural areas since most rural dwellers migrate to the urban areas in search of these facilities for themselves and their dependents. This will help

reduce the urbanization problems in the region to curb the rapid urbanization and associated health challenges in the urban centers.

### 6.4 Limitations of the study and areas of further research

As a result of the smallness of the number of countries used in the study, we do not encourage generalization of the findings. Thus, the findings from this research are limited to the countries studied. More so, all the Sub-Saharan African countries studied do not have the same level of governance system and institutional capacity. Some of the countries have better score on the governance and rule of law than others. Thus, care must be taken when making inference from this study to reflect the general setting of the region.

Due to the differences in the score of the governance and rule of law by each country which are likely to impact on the outcome of the study, we therefore propose that further studies should be carried out at the individual country level to capture the how these indices can influence the level of expenditure to yield the best result for the country since that can account for the individual country features better.

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# Appendix 1: Fixed effect model

| VARIABLES | (1)<br>IMR | (2)<br>U5MR | (3)<br>LEB |
|---|---|---|---|
| L.IMR | 0.0342*** | | |
| | (0.00753) | | |
| GHE | 0.102 | 0.496*** | -0.0203 |
| | (0.810) | (0.167) | (0.0367) |
| PHE | -1.129** | 0.555*** | -0.0268 |
| | (0.557) | (0.115) | (0.0253) |
| LAW | -24.49** | 8.970*** | -0.332 |
| | (10.17) | (2.109) | (0.463) |
| GOV | -0.141 | 0.0116 | 0.0458 |
| | (1.419) | (0.295) | (0.0644) |
| GHE*LAW | 0.0522 | -0.0934*** | 0.00322 |
| | (0.146) | (0.0302) | (0.00664) |
| GHE*GOV | 0.00132 | -0.00103 | -0.000646 |
| | (0.0214) | (0.00444) | (0.000969) |
| PHE*LAW | 0.284*** | -0.0925*** | 0.00345 |
| | (0.102) | (0.0211) | (0.00463) |
| PHE*GOV | 0.00295 | 0.000575 | -0.000539 |
| | (0.0161) | (0.00334) | (0.000730) |
| PCI | -0.00211*** | -0.000645*** | 0.000160*** |
| | (0.000796) | (0.000167) | (3.91e-05) |
| SAN | 0.144 | -0.0357 | 0.0158** |
| | (0.140) | (0.0292) | (0.00635) |
| UrPOP | -1.601*** | -0.0367 | -0.0120 |
| | (0.216) | (0.0488) | (0.0102) |
| NOR | 0.918*** | 0.0204 | 0.0103* |
| | (0.106) | (0.0246) | (0.00526) |
| L.U5MR | | 0.922*** | |
| | | (0.00555) | |
| L.LEB | | | 0.968*** |
| | | | (0.00886) |
| Constant | 199.9*** | -44.03*** | 3.975 |
| | (55.98) | (11.78) | (2.485) |
| Observations | 308 | 308 | 308 |
| R-squared | 0.737 | 0.997 | 0.994 |
| Number of c_id | 22 | 22 | 22 |

## Appendix 2: Correlation matrix

| | GHE | PHE | LAW | GOV | PCI | SAN | NOR | UrPOP |
|---|---|---|---|---|---|---|---|---|
| GHE | 1.0000 | | | | | | | |
| PHE | -0.5172 | 1.0000 | | | | | | |
| LAW | 0.1136 | -0.1544 | 1.0000 | | | | | |
| GOV | 0.0503 | -0.0265 | 0.0066 | 1.0000 | | | | |
| PCI | 0.5487 | -0.0955 | 0.0432 | 0.1017 | 1.0000 | | | |
| SAN | 0.4309 | -0.2961 | 0.0126 | 0.1698 | 0.6417 | 1.0000 | | |
| NOR | -0.0200 | -0.2618 | 0.0064 | -0.0800 | -0.1324 | -0.1415 | 1.0000 | |
| UrPOP | 0.3260 | 0.0112 | -0.0411 | 0.1072 | 0.5817 | 0.6172 | -0.1584 | 1.0000 |

Source: Author's Computations Using STATA 14.

## Appendix 3: List of countries

Angola, Benin, Botswana, Burkina Faso, Cape Verde, Cameroon, Ethiopia, The Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mali, Niger, Nigeria, Rwanda, Senegal, South Africa, Togo, Uganda, Zambia