Sustainable Development Goals for Sub-Saharan Africans' by 2030: A Pathway to Longer Life Expectancy via Higher Health-Care Spending and Low Disease Burdens

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Abstract

This article analyzes the total health expenditures nexus life expectancy in 33 sub-Saharan African countries while controlling for HIV, under-five mortality, population growth and malnutrition. By analyzing the World Bank dataset from the year 2000 to 2016, as well as an additional dataset on disease burdens-health expenditure from the Institute of Health Metrics and Evaluation that covers up to year 2019, we are able to suggest four (4) conclusions to policy makers in the region. First, Africa's health budget is mainly reliant on external donors. Losing donors imply that the region will be pushed backwards in its efforts to meet the Sustainable Development Goals (SDGs) by 2030. Second, rapid population growth in sub-Saharan Africa (SSA) raises life expectancy, which is likely to be offset by an increase in non-communicable diseases. Thus, population growth needs to be controlled in the region in order to reduce the risks of disease burdens. Third, covid-19 pandemic has placed an extra burden on health-care systems; leading to higher levels of public debt and constraining the government's ability to spend on citizen's health. Fourth, governments in SSA need to increase their health spending by establishing new health financing mechanisms to reduce disease burdens and increase population life expectancy. Failure to do so could prevent sub-Saharan African countries ability to meet SDGs.

Keywords: Healthcare Expenditures; Disease Burdens; Life Expectancy; Sub-Saharan Africa
JEL Classification Code: I-118, CO1, C23

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1. Introduction

Over1.37 billion people live in sub-Saharan Africa(Statista, 2021), with varying economic, social, and cultural characteristics. In this region, people are now living longer than ever before, with better health outcomes, as lifespan grew from 50 years in 1990 to 62 years in 2019, with decreases in infant and under-five mortality and higher health-care spending (World Bank Indicators, 2020; Kiross et al., 2020; Arthur and Oaikhenan, 2017; Byaro et al., 2018; Jaba et al., 2014). Recovery from HIV epidemics, reductions in child mortality, improved nutrition, scaling up of vaccination programs, rising individual income, distribution of insecticide-treated bed nets, and access to safe drinking water were among the factors contributed to increasing life expectancy in sub-Saharan Africa (Byaro et al., 2021; Abubakari et al., 2019; Shahbaz et al., 2019; Akachi and Atun, 2011).

By 2030, the Sustainable Development Goals (3) aims to ensure a healthy life and promote well-being for people of all ages. Its target includes bringing an end to epidemics such as HIV/AIDS, Tuberculosis, malaria and other neglected tropical diseases (Makoni, 2021) as well as to the deaths of newborns and children below 5 years of age. However, the coronavirus pandemic has halted the progress towards sustainable development goals by 2030; by disrupting key health services and even shortening life expectancy. For instance, Makoni (2020:457) reported that in Zimbabwe health "Services were overstretched before the COVID-19 epidemic, but this has now worsened dramatically as health-care workers are concerned about their risk". Jensen and McKerrow (2021:117) observed, analyzing the data from KwaZulu Natal in South Africa, "a pattern of disruption across multiple data elements and indicators covering service access, service delivery and child wellbeing". Balogun et al. (2021) reported that in Nigeria reproductive, maternal, newborn and child health services were disrupted by the Covid-19 pandemic. Adamu et al. (2020:162) voiced the concern that the Covid-19 pandemic could disrupt childhood immunization in the African continent where, they noted, "the performance of immunization programmes on the continent even in the pre-COVID-19 era was largely sub-optimal". Several studies (Dixit et al, 2021; Sow et al., 2021) assessed the impact on immunization in Liberia and Senegal and reported the extent to which such services had been disrupted by the pandemic. And scholars working in this line of inquiry have been quick to note that such disruptions could eventually prevent sub-Saharan Africa from achieving the SDG3 in the near future.

Although the average healthy life expectancy in sub-Saharan Africa has increased before the pandemic, there is still a significant gap between life expectancy in sub-Saharan Africa (SSA) and other developed regions (for example, life expectancy in Japan and China was 84 and 77 years in 2019) respectively (World Bank Indicators, 2021). Japanese people have a longer life expectancy due to fewer deaths from ischemic heart disease and cancers, particularly breast and prostate cancer (Juneau, 2021). This low mortality rate is primarily due to a low obesity rate, a low consumption of red meat, and a high consumption of fish and plant foods such as soybeans and tea (Juneau, 2021). Expanded health care systems at low cost and equity, social health insurance in developed countries like China and Japan contributed to their longer life expectancy (Shibuya et al, 2011). In 1961, Japan achieved nearly universal health insurance coverage, with social health insurance plans covering nearly the whole population (Ikegami et al., 2011). In this regard, providing low-cost and equitable health care with universal health insurance coverage remains a challenge in sub-Saharan Africa, which has poor health financing around $98 per capita in 2014, disease burdens and underdeveloped health system when compared to other regions in the world (Deaton and Tortora, 2015; IHME, 2019).

Non-communicable diseases (NCDs) such as cancer, diabetes mellitus, cardiovascular diseases, kidney diseases, road injuries and obesity remain the most serious public health challenges in the

world but they are particularly acute in sub-Saharan Africa. The diseases are dangerous and impose a long-term burden on patients and society as a whole (Jakovljevic et al., 2015). Many sub-Saharan African countries are already burdened by non-communicable diseases. Since 2015, medical researchers and other scholars have focused on informing policy makers about the rising burden of non-communicable diseases (NCDs) in sub-Saharan Africa (Bigna and Noubiop, 2019; Jakovljevic et al., 2015; Wang et al., 2015). This rising burden is major roadblocks to meeting the SDGs (3) by 2030. Worse it has been estimated that by 2030, non-communicable diseases are set to overtake communicable, maternal, and nutritional diseases in sub-Saharan Africa (Bigna and Noubiap, 2019).

Figure 1 depicts the age distribution of non-communicable disease burden in sub-Saharan Africa. The disease burden is measured in DALYs (Disability Adjusted Life Years), which include both lost years of life and years spent with the disability. The figure shows a slight increase in the region's non-communicable disease burden from 2000 to 2019. In 2019, people aged 15-49 years old suffered the most from non-communicable diseases (i.e. 60.29 million DALYs lost), followed by those aged 50-69 years old (i.e. 37.94 million DALYs lost).While children under the age of five accounts for 27.5 million DALYs lost, adults aged 70 and older account for 18.95 million DALYs lost in 2019.

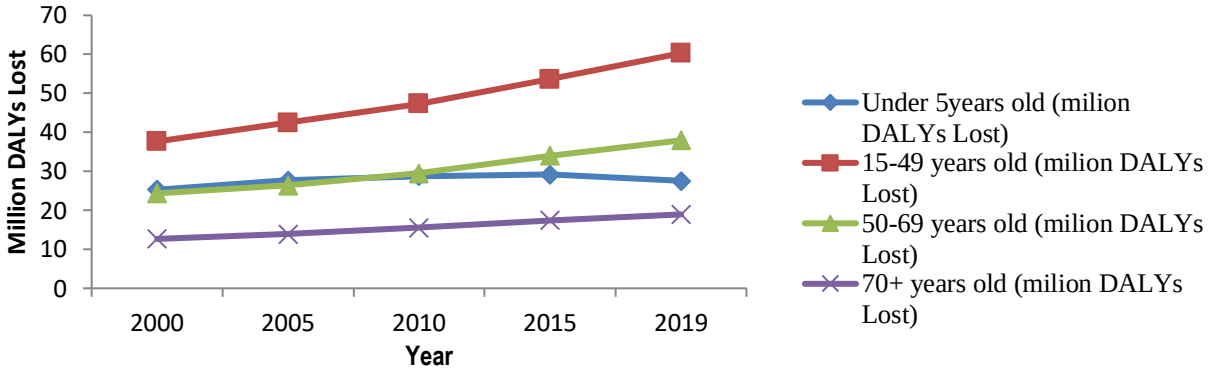

Figure 1: Disease burden from non-communicable diseases, sub-Saharan Africa by age

Source: Institute of Health Metrics and Evaluation (IHME), Global Burden of disease (2019).

The disease burden placed on societies in sub-Saharan Africa is very complex and varies over time depending on lifestyle and behavior. It jeopardizes regional progress in achieving good population health. In turn, HIV/AIDS, tuberculosis, malaria and the prevalence of malnutrition are among the major risk factors contributing to disease burden in sub-Saharan Africa (Siddharthan et al., 2015; Okoroiwu et al., 2020; Fanzo, 2012). Although the availability of HIV antiretroviral therapy has resulted in dramatic increases in life expectancy in sub-Saharan Africa, cardiovascular disease is still the leading cause of mortality among the HIV-positive population (Okello et al., 2020). HIV incidence, for example, decreased by nearly half between 2000 and 2016 (Sia et al., 2020), yet 1.7 million children and young people aged 15 to 24 are HIV-positive, with 90% of them living in sub-Saharan Africa (Frigati et al., 2020). Further evidence suggests that in 2014/15, about 26% of the population over the age of 15 had experienced acute food insecurity, an increase in the number of stunted children under age five, and the percentage of undernourished population in the region was 22.8 percent, compared to 11 percent globally (FAO, 2016;Onyango et al., 2019; Koffi et al., 2020). This evidence suggests that the HIV, diabetes, cardiovascular diseases, cancer, malnutrition, the recent corona-virus pandemic, and other disease burdens (i.e. digestive diseases, respiratory diseases) remain a serious problem in SSA and they raise some doubts about sub-

Saharan Africa's ability to ensure healthy lives for all people of all ages by 2030. Despite all of the challenges mentioned, progress has been made in reducing the number of all causes deaths in both sexes and all age. Figure 2 shows the number of all cause deaths by all ages and sexes in sub-Saharan Africa from the year 1990 to 2019.

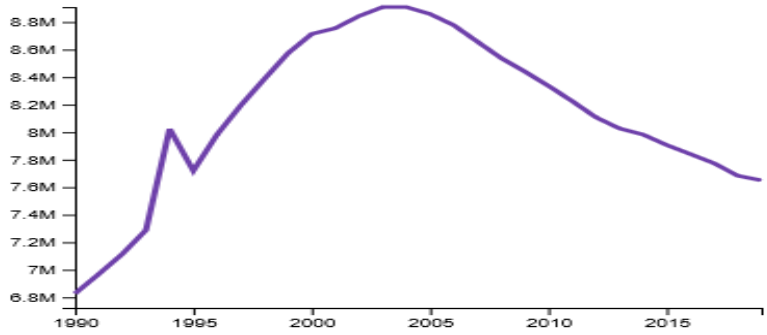

Figure 2: Number of all cause deaths by all ages and sexes in sub-Saharan Africa
Source: Global Burden of Disease (2019)

Although an effort has been made in decreasing the number of all caused deaths from 2005 to 2019, as noted earlier, there is still a rising burden of non-communicable diseases (Bigna and Noubiap, 2019). On the other hand, the health-care system and its spending patterns in sub-Saharan Africa have altered dramatically during the last decade (World Bank Development Indicators, 2021). Figure 3 shows the relationship between total disease burdens given in terms of DALYs losses per 100,000 individual from all disease causes against per capita health expenditure in United State dollars in sub-Saharan Africa. These data are normalized for easier interpretation. Figure 3 show that increasing health expenditure in sub-Saharan Africa reduces all-cause disease burdens from 2000 to 2019. It is also clear that treatment and prevention strategies for all cause disease burdens are linked to health-care spending toward Sustainable Development Goal 3 (Micah et al., 2020; Su et al., 2020).

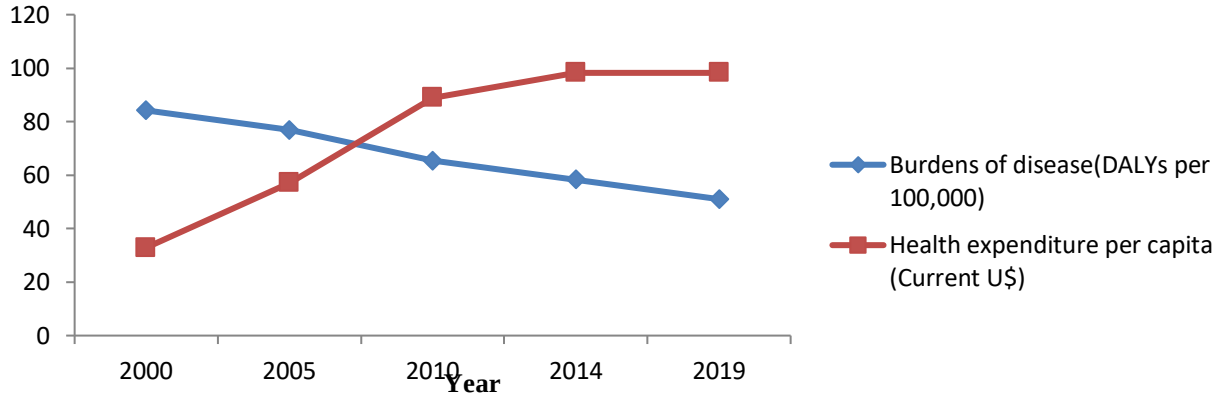

Figure 3: Relationship between Burdens of disease and health expenditure per capita in sub-Saharan Africa
Source: Institute of Health Metrics and Evaluation (IHME), Global Burden of disease (2019).

Figure 3 show that health care spending contributes to greater health outcomes through medical care and lower burdens of diseases which could lead to improved long-term health.

Government health spending is a major source of all health funding in sub-Saharan Africa. While the government pays for a large portion of healthcare costs, the rest is paid for by individuals. This implies that total health expenditure includes both private out-of-pocket and government health spending. Figure 4 shows the trends in current health expenditure as percentage of GDP in sub-Saharan Africa (SSA), in comparison to East Asia and Pacific and European Union (World Bank Indicators, 2021). In 2018, SSA spent 5.2 percent of GDP on health, which is still low when compared to East Asia-Pacific (6.7 percent) and the European Union (9.8 percent).

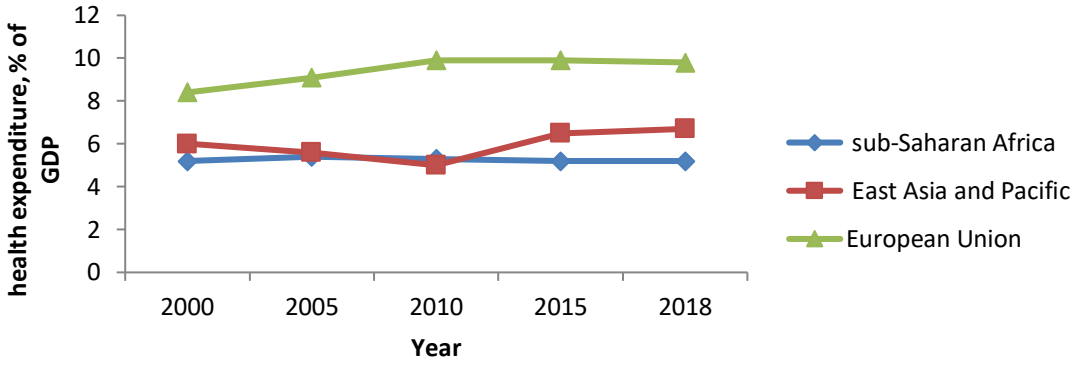

Figure 4: Current health expenditures as a percentage share of GDP in sub-Saharan Africa and other regions

Source: World Bank Indicators (2021).

While SSA spends little in health care, it is worth noting that it continue to experience significant population growth, which poses serious challenges to socioeconomic development by forcing governments to meet the needs of young people (for example, health, nutrition, education). With rapid population growth, severe disease burdens and low (but rising, at least on a per capita) health spending, we aimed to investigate whether the changes in health-care spending (i.e. spending linked to disease burdens) had a clear impact on the region's population life expectancy for 33 sampled countries.

Our study adds knowledge to the current literature by applying a system GMM (Generalized Method of Moments) dynamic panel model that eliminates the problem of omitted variables bias and other reverse causality (i.e. simultaneity), between health care expenditures, country income and life expectancy as well as a lagged value that affects population life expectancy (see, Byaro et al., 2021; Awadhi et al., 2022; Kinyondo et al., 2020). We also applied the Roodman *collapse* options to ensure that the numbers of instruments controlling endogeneity of variables are less than the number of countries to avoid inconsistency estimation with previous studies failed to report instruments counts (See, Novignon and Lawanson, 2017; Nicholaus et al., 2016; Novignon and Nonvignon, 2012; Kiross et al., 2020). These scholars used fixed and random effects model which cannot handle endogeneity (i.e. simultaneity) of variables; instead it handles strict exogeneity of regressors (Byaro, 2021).

This study is organized into five sections. The second section includes a review of the literature. The third section describes the methodology and sources of data. The results and discussion are presented in the fourth section. Section five presents the conclusion.

2. Literature Review

A number of studies have been empirically investigated the link between health care expenditure, life expectancy and disease burden in both developed and developing countries. For instance, Ojo et al (2021) examined the link between expenditure and life expectancy in Nigeria using autoregressive distributed lag from the year 1981 to 2018. Their study found that health care

expenditure had insignificant impact on life expectancy. However, Owuni and Eboh (2021) found an increase of government health expenditure in Nigeria lead to an increase in life expectancy in Nigeria. They concluded that healthcare system funding influenced life expectancy in Nigeria for the past years from 2000 to 2017. Using data from Cameroon, Nkemgha et al (2020) analyzed the effect of health care expenditure and life expectancy from 1980 to 2014. Their findings showed that private health expenditure have positive and significant impact on life expectancy while public health expenditure has no significant impact on life expectancy. Makiyan et al (2016) analyzed the health expenditure and life expectancy in Islamic countries from 1995 to 2013. Their results showed that government health expenditure has a positive relation with life expectancy in high per capita income countries but a negative relation in low per capita income countries. In turn, their results showed positive relation between education and life expectancy. They concluded that health improvement should be accompanied by improvement of education and water resources. In sub-Saharan Africa, total health care per capita led to an increase in life expectancy (Chireshe and Ocran, 2020). This was also supported by Arthur (2017) that private health care expenditure improves life expectancy in sub-Saharan Africa.

Obrizan and Wehby (2012) found that increasing healthcare expenditures in 177 countries provided a significant population life expectancy. It's also true that countries with similar levels of health expenditures show different life expectancy. For instance, Zarulli et al (2021) showed that countries with decreasing unemployment and income inequality experience an increase in average life expectancy without increasing health expenditures. Meanwhile, life expectancy in low and lower middle income countries is influenced by physician density, economic freedom, income per capita, years of schooling and total fertility rate (Islam et al., 2018). Likewise, health coverage (universal health coverage), socio economic status, disease prevention, changes in lifestyle all influenced life expectancy (Ranabhat et al., 2018).

Taylor and Salkeld (1996) examined how well Australia performs in terms of health care expenditure and life expectancy. They found that high life expectancy was contributed by social and economic conditions, successfully public health progress and availability of universal quality health care. Heuvel and Olaroin (2017) used a cross sectional study of 31 European countries found that health care expenditure is not the main determinant of life at birth. Their results showed that countries with citizens who report fewer unmet health care needs and drink less alcohol have significant longer life expectancy. Poor nutrition in early life is also associated with impaired cognitive development and linked to lower human capital attainment, life expectancy and lower socio-economic status in the adulthood (Currie and Almond, 2011; Hoddinott et al., 2013). Exposure to Potato Famine for the 1846-1847 in Netherlands reduced life expectancy at age 50 by approximately 3 years (Lindeboom et al., 2010). Jen et al (2010) argued that the greater the life expectancy in one country, the healthier its population.

The above literature shows mixed evidence on health care expenditure and life expectancy. In this paper, we examine whether health care expenditure, disease burden (i.e. HIV) can affect life expectancy in sub-Saharan Africa using two-step system GMM (Generalized Method of Moments) estimator for 33 sampled countries.

3. Data sources and methodology

We sampled a total of 33 countries in sub-Saharan Africa from 2000 to 2016. All the variables used in this regression analysis were extracted from the World Bank's Development Indicators (2018). We complement the above-mentioned data with disease burdens and healthcare spending data from the Institute of Health Metrics and Evaluation (IHME), Global Burden of Disease

(2019), to create the figure highlighted in the introduction. Table 1 shows the variables chosen and used in regression analysis, as well as their units and sources.

Table 1: Variables, units and its sources

Variables	Unit	Sources of data
Life expectancy at birth	Total years	World Development Indicators (2018)
Under five mortality	Deaths per 1000 live births	World Development Indicators (2018)
Population growth	Annual %	World Development Indicators (2018)
HIV/AIDS infection	%	World Development Indicators (2018)
Prevalence of undernourishment	% of population	World Development Indicators (2018)
Total health expenditures	% of GDP	World Development Indicators (2018)

Source: World Development Indicators (2018)

3.1 Model

We describe our health production function from a theoretical standpoint, which includes total health expenditure (Expe) and other independent variables as follows:-

$$Life\ expectancy_{i,t} = \phi + \propto Life\ expectancy_{i,t-1} + \beta Expe_{i,t-1} + \gamma Z'_{i,t-1} + \varepsilon_{i,t} \quad . (1)$$

For$i$= 1, 2.....N (Countries) and $t = 1$, 2.....T (time).
$\varepsilon_{i,t}$ = idiosyncratic error (error term for country i and time t
$\varepsilon_{i,t} = u_{i,} + \gamma_t$, where
γ_t= time specific fixed effects,
μ_i= is the country specific fixed effects constant in time
$t - 1$= lagged time

ϕ, $\propto$, β, $\gamma$are coefficients of estimated parameters and Z′=Vector of other explanatory variables which includes HIV/AIDS, malnutrition (undernourishment), population growth, under-five mortality. HIV/AIDS, malnutrition and under-five mortality represents disease burden. For easy estimation and interpretation of parameters in terms of elasticity, all variables indicated in Eq. (1 & 2) were transformed to logarithmic form.

3.2 Estimation strategy

In the model shown in Eq. (1), our variable of interest is total health expenditure, which is represented by coefficient (β). Because of the endogeneity between health expenditure and other explanatory variables, actual estimates of β is biased. This is due to a reverse causal relationship between health expenditure and under-five mortality, population growth and life expectancy. Likewise (life expectancy$_{i,t-1}$) and (health exp$_{i,t-1}$) may be correlated with other unobservable characteristics which are captured in the error term. An instrumental variable technique, such as Generalized Methods of Moments (GMM), should be utilized to overcome this endogeneity problem. Arellano and Bover (1995); Blundell and Bond (1998); and Roodman (2009) described the two-step system GMM instruments that are suitable for dealing with endogeneity (i.e. omitted variable bias and reverse causality). Due to lags of the dependent variable, specific country fixed effects, and endogenous independent variables, we adopt system GMM estimators (See Byaro et al., 2021; Awadhi et al., 2022; Kinyondo et al., 2021; Roodman, 2009).

Our data includes both large (N=33 countries) and small (T=17 years) samples that are compatible with the GMM methodology. By differencing Eq. (1) throughout the estimation process, the

system GMM reduces unobservable individual country specific fixed effects and omitted variable bias as follows:-

$$\Delta Life\ expectancy_{i,t} = \phi + \propto \Delta life\ expectancy_{i,t-1} + \beta \Delta heath\ exp_{i,t-1} + \gamma \Delta Z'_{i,t-1} + \Delta \varepsilon_{i,t}. \quad (2)$$

Furthermore, to estimate the coefficient of parameters, the two-step system GMM estimator combines the differenced Eq. (2) and level Eq. (1) and uses a lag in level and differenced variables as an internal instrument. Lagged differences are the instruments in the level Eq. (1) for independent variables, while lagged level variables are the instruments in the differenced Eq. (2)

4. Results and discussion

The descriptive statistics for all variables chosen for the study are summarized in Table 2. Due to lack of data from other countries, our analysis relied on an unbalanced panel. According to the findings, the average life expectancy and under-five mortality rate in 33 sub-Saharan African countries were 56 years and 105 deaths per 1000 live births, respectively. Total health expenditures (private and public as a percentage of GDP) averaged 5.77 percent. The average rate of population growth was 2.7 percent. The average rate of HIV infection is 6%. The average level of malnutrition (undernourishment) was 25%.

Table 2: Summary Statistics

Variables	Observation	Mean	Minimum	Maximum
Life expectancy	561	56	38.7	67.15
Total health expenditure(public +private)	500	5.7	.84	19.73
Undernourishment rate	498	25	4.3	71.5
HIV rates	561	6	0.1	27
Population growth	561	2.7	0.81	5.54
Under five mortality	561	105	38.5	233.1

Source: Authors computation (2022)

Table 3 displays the model estimation results for population life expectancy. The findings show that the current life expectancy is determined by the previous life expectancy. Health expenditures (total public and private) and population growth are associated with an increase in population life expectancy. A 10% increase in health-care spending corresponds to a 0.13 percent increase in population life expectancy. Similarly, a 10% increase in population growth is associated with a 0.26 percent increase in population life expectancy. Furthermore, a 10% increase in under-five mortality which is related to burden of diseases is associated with a 0.55 percent decrease in life expectancy. As shown in Table (3), all of these coefficients are statistically significant at the 1% and 5% levels. Other variables (HIV/AIDS rates, malnutrition rates) are not significant, but their coefficient estimates have the expected sign. The second order serial correlation test and the Hansen test both show valid findings since (p-value >0.10).

Table 3: Result for system GMM estimates

Independent variables	Coefficients estimates
	Dependent variable (Life expectancy)
Life expectancy (t-1)	0.774***(0.06)
Total health expenditures	0.013**(0.01)
Undernourishment rate	-0.001 (0.001)
HIV rates	-0.002(0.006)
Population growth	0.026***(0.009)
Under five mortality	-0.055***(0.016)
Constant	1.12***(0.341)
Second Order Serial Correlation Test	[0.17]
Hansen Test	[0.26]
Number of observation	413
Number of instruments	26
Number of groups/countries	29

Note: * p < 0.1, **p < 0.05 and ***p < 0.01; Robust standard error in parenthesis ( )
All variables are expressed in natural logarithm
The *p-value* for Hansen Test and Second Order Serial correlation test in parenthesis [ ]

It is clear that non-communicable and communicable diseases (NCDs) are a major public health concern that both developed and developing countries face. Understanding the disease burdens are important for health planning policy making and health care delivery in sub-Saharan Africa. Our findings show that total health expenditure increases life expectancy. According to this viewpoint, the regions should allocate at least 15% of their national budget to improve healthcare system, as stipulated in the Abuja Declaration of 2001. However, fulfilling this pledge has been a struggle for the sub-Saharan African countries member states. While government health budgets in middle and high-income countries include various types of taxes and social health insurance payments (WHO, 2017), WHO (2018) projections show that domestic resources in low-and middle-income countries can cover 85 percent of the cost of achieving the SDG health targets. The lack of commitment by African governments to allocate more funds to health has been attributed to a lack of funding, which appears to be a political issue. Sub-Saharan countries should find proper solutions to increase their financial resources to health sector to achieve Sustainable Development Goals (SDGs) in 2030. Increasing health spending will decrease both communicable and non-communicable disease burdens in future. For instance, restructuring health systems at local and central levels so that health spending accounts for 15% of total spending in order to support universal health insurance programs for all people. This would raise health spending over time while also ensuring long-term health finance. To increase life expectancy in sub-Saharan Africa, increased public health spending must be supplemented by increased spending in other sectors such as water supply, road network, and education (Byaro, 2021). Such increases must also be accompanied by policies, institutions, instruments (for example, Public Expenditure Review and Management) and anti-corruption measures (Wagstaff, 2002). Greater health spending would allow sub-Saharan Africa's public health system to be fully developed, including health facilities, upgrading primary health infrastructures, increases in physician numbers and training more physicians to identify diseases causes and its treatment procedure. If SDGs are to be realized in sub-Saharan Africa, an extra effort should be done to increase the healthcare spending pattern.

Additional health funding is required to reduce disease burdens and address the health personnel shortage.

Recently, Africa is heavily relying on external donors to funds its health budget (Ifeagwu et al., 2021). Donors fund all vaccination programs, HIV/AIDS, tuberculosis, and malaria control. Loss of donors in the health sector implies that sub-Saharan African countries will be pushed backwards in their efforts to meet the SDGs.

While an increase in under-five mortality reduces life expectancy, rapid population growth increases it. As sub-Saharan Africa's population grows, the burden of communicable and non-communicable diseases may rise in future. That is, an increase in life expectancy is likely to be offset by an increase in non-communicable diseases. Therefore, once again, future population growth needs to be controlled in the region. This is important for informing health policy in all African countries.

Our overall findings imply that sub-Saharan Africa's governments should increase health spending to maintain good health (i.e. reduces disease burdens) at low cost to its people while controlling population growth and maintain sustainable health financing in future. To end this discussion, new health financing mechanisms are required in the region to support population life expectancy.

5. Conclusion

The Covid-19 pandemic has revealed the fragility, the challenges, but also the resilience of public health institutions in SSA. It showed that in most instances services were disrupted or underutilized, that some countries were more successful than others in developing strategies to cope with the Covid-19-induced disruptions, that the Covid-19 placed an extra burden on the health systems, diverted the attention from other diseases, and affected the routine immunization.

In so far as childhood immunization is an essential step to prevent/reduce/minimize infant/under-five mortality, the fact that the Covid-19 pandemic took a toll on the immunization program could have long lasting implications for infant/under-five mortality and, eventually, for life expectancy in the region. The data we have analyzed in this paper make, in fact, very clear, that infant or rather under-five mortality has a strong, negative and statistically significant impact on life expectancy. Population growth, our analyses revealed, is a determinant of life expectancy. More importantly, our analyses revealed that total health expenditures have a strong, positive and statistically significant impact on life expectancy in SSA. This means that life expectancy is a function of how much is spent to secure/ensure that citizens live longer and healthier lives.

The Covid-19 pandemic represents a problem even in this regard. Covid-19 has taken a toll on economic growth in SSA Africa, it has led to growing deficits and higher levels of public debt, thus constraining in the years to come governments' ability to spend for the health and the well-being of their citizens. Meanwhile the slowing down of African economies, especially of those that were more detrimentally affected by the Covid-19 pandemic, may constrain citizens' ability to make out of pocket payments to seek more and better treatment.

A few years ago Pelizzo et al. (2018) suggested that Africa's progress along the development path was, among other things, made possible by improvements in public health. These authors went on to note that "some of the progress made in the 2002–2012 period, in terms of public health, is coming undone" (Pelizzo et al, 2018:278) and supported their claim by citing the rising number of cases of cholera, hepatitis E, malaria and measles. The Covid-19 crisis has at best prevented further improvements in the provision of health services and at worst has been responsible for their

deterioration. And, with fewer resources at the disposal of governments and citizens, access to and the provision of health services may deteriorate even more with obvious and negative consequences for development, under-five mortality and life expectancy.

In so far as we are correct in advancing such claims, the policy implications are fairly clear. To compensate with citizens' decreasing ability to make out of pocket payments for health services, governments in SSA need to dig deeper in their pockets and increase their expenditure on health. Failure to do so could prevent African countries from achieving some of the SDGs and to compromise some of the developmental accomplishments that the continent was able to achieve in previous years.

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