NIU Journal of Social Sciences Copyright©2023
Nexus International University ISSN: *3007-1682*; 9(4): 29-42

Determinants of Health Inequality in Sub-Saharan Africa: Further Evidence from Feasible Generalized Least Squares (FGLS) Approach.

SUNDAY OSAHON IGBINEDION, JOHN TONGSHINEN GOZHAK
University of Benin, Benin City, Edo State, Nigeria.

Abstract: A nation's progress is largely influenced by its state of health. This is so because a healthy people are not only able to work and support themselves, but are able to make a significant contribution to the socio-economic expansion and improvement to the community in which they reside. One of the major limitations to achieving the above fit is the increasing health disparity in the larger ecosystemn. And, despite the several initiatives and programmes developed to narrow the growing health gap across the various social strata among individuals around the world, it still persists. Motivated by the need to bridge this rising health gap, this study examines the determinants of health dispraities within the context of sub-Saharan Africa for the period 2004 to 2022, using the panel feasible/estimated generalised least squares. The results revealed that while public health spending per capita, income per capita, and health-oriented net official development assistance negatively and statistically impacted on health inequality, unemployment and income poverty positively and significantly impacted on halth inequality in sub-Saharan Africa. Accordingly, the paper recommends, amongst others, the urgent need for policy makers in SSA region to pay greater attention to budgetry allocations to the health sector for the provision of health insurance and quality and affordable healthcare services. Such efforts should be complemented with the formulaion of workable, active, measurable and employment-based policies across SSA region, aimed at creating stable and profitable jobs for the unemployed and under-employed masses.

Keywords: Health, Inequality, Poverty, Income, Budget.

1. Background Information

Any country's progress is greatly influenced by its state of health (Weil, 2020; Lilley, Lilley, and Rinaldi, 2020). This is due to the fact that an economically successful nation is one that has a healthy population, and healthy people are able to work and support themselves. Additionally, they will be able to make a significant contribution to the socioeconomic expansion and improvement of the community in which they reside. Specifically, a healthy nation tends to spend less on problems relating to its citizens' health. As a result, Goal 3 of the Sustainable Development Goals (SDGs) seeks "to ensure healthy lives and promote well-being for all at all ages (Good Health)" in order to "ensure healthy lives and promote well-being for all at all ages". This is consistent with the United Nations' (2015) argument that the achievement of excellent and egalitarian health requires more than merely the promotion of good health.

According to the World Health Organization's (2017), "every human being, without distinction of race, religion, political belief, economic or social condition, has a fundamental right to the enjoyment of the highest attainable standard of health." Lacklustre or ineffective health care systems, sickness, and maladies have a substantial negative influence on people's ability to work and make a living throughout their lifetimes, and this eventually threatens a country's ability to thrive economically (Abegunde and Stanciole, 2006; Amponsah and Amuasi, 2020). The factors that affect the quality of health, according to the World Health Organisation (2014), are the "complex, integrated, and overlapping social structures and economic

systems" that are likely to have an impact on health inequality in society at large.

Social determinants of health (SDH) are defined as the "specific non-medical circumstances that affect the behaviours and health outcomes in a society" by the World Health Organisation (2023). When people are born, develop, work, live, and age, as well as in a broader design of socioeconomic elements and activities that have a tendency to influence the context of people's everyday lives in society, these intervening elements frequently take the form of interfering conditions. Tseng and Wu (2021) identified socioeconomic elements, to include political arrangements and actions, economic policies and structures, regulatory objectives, expectations from society, social norms, and ethical behaviour, that have an impact on individual's behaviours and actions in the larger economic landscape.

These elements explicitly allow for health disparity in the larger ecosystem. The current wave of health disparity, which affects both emerging as well as established nations, is a major focus of global health campaigns. According to Amponsah and Amuasi (2020), issues including poor or inadequate health system architecture, and illnesses have a negative impact on people's work lives and lifelong incomes, which ultimately results in a decrease in a country's growth prospects. Over 6 million children die before turning five, according to the United Nations Development Programme (UNDP, 2021), and 16,000 among these young children still pass away every day from illnesses that can be prevented. In addition, relative to children born and reared in wealthy homes, the majority of children who experience poverty are about twice as likely to pass away before turning five (UNDP, 2021). This is primarily because they are unable to receive high-quality, reasonably priced healthcare treatments.

In addition, UNDP (2021) asserts that over 87% of births in towns and cities get access to higher-quality care, compared to about 50% of total births in rural neighbourhoods in emerging nations. This disparity highlights the extent of health inequity around the world. This suggests that city dwellers have more access to health care than their counterparts in rural locations. The inference is that the growing tendencies within and between nations with regard to the poor and wealthy individuals are biased, unfair, unjustified, and avoidable, as well as the widening gap between the rich and the poor in terms of access to excellent health. This is due to the fact that many of the health disparities between the wealthy and those who are economically disadvantaged in many nations are caused by the biased processes of decision-making, flimsy policies, cultural standards, and crumbling institutional structures currently in place at all levels worldwide (Marmot, et al., 2012).

United Nations Development Programme (2021) further submits that, a rising percentage of children and maternal mortality occurs in sub-Saharan Africa in addition to Southern Asia, with 80 percent of child death below the age of five arising from these regions. Compared to what obtain in developed nation, the maternal mortality ratio, which assesses the proportion of women who die after childbirth in comparison to mother’s who survive, is still 14 times greater in emerging economies (UNDP, 2021).

Sub-Saharan African economies are associated with low per capita income (Gardner, 2022; Gil-Alana et al., 2021; Selassie and Hakobyan , 2021; The World Bank, 2022), high rates of income poverty (Saidi et al., 2023; Schoch and Lakner, 2020), increasing rate of unemployment (Akinyele et al., 2022; Byaro et al., 2023), relatively weak government health expenditure (Eze et al., 2022; Micah et al., 2019), along with poor health outcomes like an increase in infant and maternal deaths, cases of child malnutrition, a shortened life expectancy, and policy mistakes, especially in important economic sectors like the health sector (World Bank, 2013a; 2013b; 2019).

Dover and Belon (2019) noted that inequalities in health are socially driven leading to a restriction of the poorer population from rising progressively to the desire health state in society. This further weaken their ability to effectively utilise the most of their potentials. Cockerham (2021) also submitted that since health inequities are largely the product of social prejudice, they can be circumvented. Several initiatives and programmes have been developed to narrow the growing health gap across the various social strata among individuals around the world. Among these initiatives, the World Health Organization's official development assistance and the United Nations' SDGs for health stand out. In spite of such initiatives, the health gap still lingers especially across sub-Saharan Africa countries.

Motivated by the need to bridge this rising health gap, this study examines the determinants of health diparities within the context of the sub-Saharan African continent for the period 2004 and 2022, using the panel feasible/estimated generalised least squares (FGLS/EGLS) regression technique. This choice of this sample size is due to unavailability of data for some of the determinants identified, while the

countries are selected based on the criterion of best performing sub-Saharan African countries by Gross Domestic Product as per IMF 2022 estimates.

2. Literature Review

2.1 Conceptual Issues

2.1.1 The Concept of Health.

Health, according to the World Health Organisation (WHO, 2006, 2013), is "a state of complete physical, mental, and social well-being; not just the absence of disease and infirmity." This suggests that someone in good health can have a fulfilling life on both social and economic level (Shonkoff et al. and Committee on Childhood Development, Adoption, and Dependent Care, 2012). This definition is wide and takes into account the overarching objective of optimum wellness for all people, regardless of social class (World Health Organisation, 2015; Kühn, and Rieger, 2017). The State has an inevitable obligation to ensure the population's good health, and in order to execute this duty, health services must be freely accessible to all citizens. In light of this, health care ought to be viewed as one of the essential human rights, and as such, it ought to be offered free of charge to all people (World Health Organisation, 2015; Rahman et al., 2020).

The health of people in society is affected by a variety of elements acting together. Political, socioeconomic, sociocultural, environmental, or clinical issues all may be present. Individuals' situations and environments dictate whether they are healthy or not. In the case of healthcare, the degree of access and usage of health care services is frequently influenced by the lives of individuals, the environment they live in, their genetics, their financial standing, and their educational attainment (Myers, 2009; Chukuezi, 2010; Renzaho, 2020). At the local level, local governments are tasked with providing health care in accordance with the overarching national health policy, in cooperation with the state ministries/departments of health.

2.1.2 Concept of Health Equity/Inequity

World Health Organization. (2010) defines health equity as "the absence of unfair and avoidable or remediable differences in health among population groups defined socially, economically, demographically or geographically". Therefore, in order to achieve health equality, it is necessary to remove barriers to health which includes poverty, prejudicial beliefs, and their effects, such as lack of access to safe surroundings, quality housing and education, in addition to medical care (Braveman, et al. 2017).

According to the World Health Organisation (2023), social factors that influence health are more important than personal lifestyle or health care decisions. For example, several earlier research have shown that socioeconomic variables of health account for between 30% and 55% of health outcomes globally (WHO, 2023). Consequently, addressing the socioeconomic drivers of health effectively by every sphere and members of civil society will contribute to health improvement and the amelioration of recurring disparities in health care access (World Health Organisation, 2013).

Inequalities in the healthcare system are defined by McCartney et al. (2013) as the unfair disparities in health across groups of persons holding various social statuses. Age, financial security or economic position, education, place of residency (urban vs. rural), genders, and subnational area are six perspectives of inequality that the World Health Organisation (2023) captures. These parameters were taken from the WHO Health Equity Monitor database. Living and working circumstances, the lack of professional healthcare services, educational attainment, economic trends, discrimination based on race and ethnicity, neighbourhood characteristics, as well as the extent of social classification in the community are a few factors that frequently cause health disparity (Lee and Ahmed, 2021; David and Collins, 2021).

What this suggests is that there are different social factors influencing health that have significant effects on health disparities, such as early childhood development, academic achievement, food insecurity, living expenses, basic facilities, access to reasonably priced health services of acceptable quality, the environment, income and protection from poverty, integration into society and equality of opportunity, structural conflict, unemployment and job insecurity, and working conditions in life (Brennan-Ramirez, Baker and Metzler, 2008; Solar and Irwin, 2010; Swope and Hernández, 2019; Lathrop, 2020).

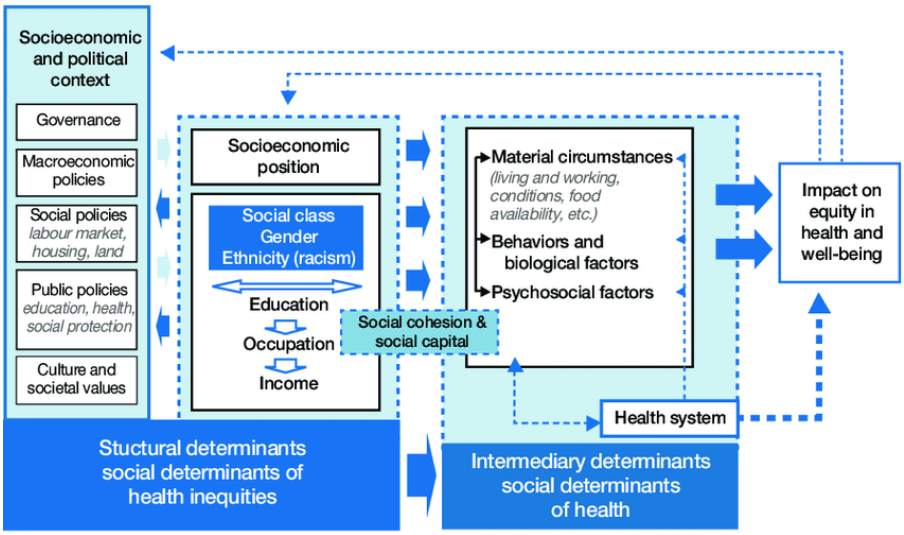
2.2 Theoretical Issues: Structural Theory of Health Inequalities

A numbr of the independently conducted assessments of health inequalities in the UK have used structural theory of health inequities as their primary analytical framework (McCartney et al., 2013; Navarro et al., 2006). The theory contends that variations in

socioeconomic background of different social strata (including disparities in income, financial status, influence, the environment, and accessibility to equal opportunity) at all levels of the life-course frequently result in disparities in overall health of individuals throughout the community (Krieger et al., 2008). This is predicated on the assumption that health care services are accessible and that every individual in a society has an equal right to access these healthcare services.

According to structural theorists of inequality in health, behavioural, political, and social differences within a population are the cause of inequalities in healthcare (McCartney et al., 2013). In short, structural inequalities produce uneven quality of life through a variety of social as well as economic channels, such as employment, financial status, living expenses, as well as education (Solar and Irwin, 2007). The structural factors that contribute to health disparities are shown in Figure 1.

Figure 1: Structural determinants of health inequalities



Source: *Adapted from Kim and Lee (2013).*

2.3 Review of Empirical Studies

Dover and Belon (2019) adopted the Health Equity Measurement Framework, which was precisely developed for measuring the direct and indirect impact that several determinants of equitable health service utilization exert on health equity. It was found that the socioeconomic, cultural, and political context, biological factors, environment, health policy setting, healthcare utilization frequency, health-related behaviours and views, material and social conditions, quality of care, social location, social stratification, and stress, influence health inequity.

Jayasinghe (2015) applied the principles of systems approach and complexity science in conceptualizing social determinants of health disparities among individuals in the society. The study established that political freedom, educational outcomes and economic development are key factors influencing health inequalities. Also, Baciu, et al. (2017) assessed the root causes of health inequity and found that disability, access to good food, housing and water, living conditions, and the quality of schools, employment and socioeconomic status, gender, geography, immigration status, race and ethnicity are the social, environmental, economic, and cultural determinants of health equities across nations.

In a related study, Swope and Hernández (2019) evaluated the impact of housing on health disparities using a holistic conceptual model. Specifically, the study discussed some pathways through which structural disparities dictate unequal delivery or disproportionate access to health. It was established that housing affordability, quality, residential stability in addition to neighborhood opportunity form the four pillars that have the tendency to trigger increasing burden of health disparities, while the right to health requires more careful consideration of the social factors that are the root of inequality, including income and socioeconomic standing, the availability of medical care, biological science and hereditary, which is experiences in childhood,

cultural backgrounds, literacy and educational attainment, employment and working circumstances, sex, behaviours that are healthy, physical surroundings, ethnic background, benefits and protections from government, and coping mechanisms, according to Chapman (2010) and Adler, Glymour, and Fielding (2016).

Additionally, the American Academy of Family Physicians (2019) found that social, economic, and political forces are among the many causes of health disparity. Long-standing social disparities in society are triggered by social elements including tobacco, alcohol, or explicit drug use, chronic stress and embodiment, governance, culture, societal ideals, and public policy, while Nutbeam and Lloyd (2021) found that health literacy may serve as in intervening factor influencing health. This however doesn't automatically translate into mitigating health inequities which resulted from the misallocation of socioeconomic prospects and resources in the society. The study further reiterated that current interventions programmes can help in refining and stimulating health literacy particularly as it relates to individuals with higher-risk.

Moonesinghe, Bouye and Penman-Aguilar (2014) also examined the social determinants of health with special consideration to factors such as the distribution of wealth, income, power as well as influence which serve as triggers for risk of disease. The study found that there can be significant variation in inequity among two populations as a result of a risk factor which they considered to be discriminating and preventable for a specific disease. The variation was occasioned by the occurrence of the risk factors like unequal distribution of wealth, low income, power as well as social influence in the two populations.

Generally, the reviewed literature revealed that previous studies relating to the subject of health inequalities have not empirically investigated the impact of the various factors (such as per capita income, net official development assistance from WHO, the rate of unemployment in an economy, income poverty and domestic general government health expenditure per capita) on health inequity proxied by proportion of individual without access to healthcare services, especially in the context of sub-Saharan Africa. Also, the literature seems to be lacking in terms of recent studies addressing similar issues by employing data set covering most recent years. Thus, this study is an attempt to bridge such empirical gap by examining the determinants of health inequity in sub-Saharan African economies for a period of seventeen (19) years spanning from 2004 to 2022.

3. Research Methodology

3.1 Theoretical Framework

The theoretical foundation of this study is premised partly on the structural theory of health inequality, which identifies disparities among incomes, status, influence, the surroundings, as well as accessibility as the primary causes of health inequality (see sub-section 2.2), and partly on the health inequality framework constructed by Dover and Belon's (2019) study in accordance with the Health Equity Measurement Framework, which encompasses socioeconomic status, cultural, and political circumstances, biological variables, the environment, and utilisation of health services.

3.2 Model Specification

Arising from the foregoing theoretical underpinnings, the adapted health inequity measurement framework is presented in the model given as follows;

HINEQ = F(GEXP, PCI, UNEMP, INPOV, AIDWHO)

The parameterised structural model is also presented as follows;

$$\mathrm{HINEQ}_{it} = \beta_0 + \sum_{i=0}^{l} \psi_{ij}\,\mathrm{GEXP}_{it} + \sum_{i=0}^{m} .\Upsilon_{ij} PCI_{it} + \sum_{i=0}^{n} \alpha_{ij}\, UNEMP_{it} + \sum_{i=0}^{o} \omega_{ij}\,\mathrm{INPOV}_{it} + \sum_{i=0}^{p} \varphi_{ij}\,\mathrm{AIDWHO}_{it} + u_t \ldots\ldots (1)$$

Where;

Subscript *'t'* indicates time period, Subscript *'i'* indicates specific country in the sub-Saharan African region; β_0 is the intercept in the model, ψ_t, Υ_i α_i, φ_i *and* ω_i, are the impacts measuring parameters of the respective variables

captured in the model, μ_t is the stochastic disturbance term that captures every other extraneous variable that influences health inequity but not included in the estimation model.

3.3 The Data and Variable Description

The goal of the study is to look at the factors that affect health equity in the fifteen sub-Saharan African nations that have the highest economic performance, as determined by the International Monetary Fund (IMF) (2022), for a period of nineteen (19) years (2004-2022) for each of the nations. The chosen countries are South Africa, Nigeria, Ethiopia, Kenya, Angola, Ghana, Tanzania, Cote d'Ivoire, Congo Democratic Republic, Cameroon, Uganda, Sudan, Senegal, Zambia, and Zimbabwe,These nations were chosen based on how well they performed economically in sub-Saharan Africa, . Consequently, a total of 285 observations are included in this analysis. The variables are explained in the table below.

Table 1: The Data and Variable Description

Variable	Definition	Source	Apriori expectation
HINEQ	**Health Inequity** Proportion of people with no access to health services	Health Equity and Financial Protection Indicators (HEFPI) (2022).	NA
GEXP	**Per-capita government health spending in current US dollars.** Calculations of current health spending encompass the cost of medical supplies and procedures used annually.	World Health Organization Global Health Expenditure database (2022).	Negative (-)
PCI	GDP per capita	World Bank (2022).	Negative (-)
UNEMP	**Unemployment rate** percentage of the labour force that is unemployed while looking for job.	International Labour Organization, ILOSTAT database (2022).	Positive(+)
INPOV	**Income poverty** "Proportion of population below US$1.25 a day"	World Bank (2022).	Positive(+)
AIDWHO	**Net official flows from WHO** the total of the World Health Organization's (WHO) Official Flows as well as Official Development Assistance (ODA), All figures are in current United States dollars.	WHO Data base (2022)	Negative (-)

Table 2: Fifteen best performing sub-Saharan African countries by Gross Domestic Products as per International Monetary Fund 2022 estimates.

S/N	Country	Nominal GDP (Billion US$)	S/N	Country	Nominal GDP (Billion US$)
1	Nigeria	504	8	Ivory Coast	68
2	South Africa	419	9	Democratic Republic of the Congo	63
3	Angola	124	10	Uganda	48
4	Ethiopia	113	11	Cameroon	44
5	Kenya	110	12	Sudan	42
6	Tanzania	76	13	Zimbabwe	38
7	Ghana	75	14	Senegal	27
			15	Zambia	27

Sources: *International Monetary Fund (IMF). (2022, October).*

3.4 Method of Data Analysis

The present research uses the feasible/estimated generalised least squares (FGLS/EGLS) approach, which was previously used in the works of Mumuni and Mwimba (2022) and Alabi and Olaoye (2022), to analyse the data for the purposes of empirical analysis and hypothesis testing. This method was taken into consideration since it produces accurate, dependable, and efficient estimators. Additionally, it has been shown that the feasible GLS estimator is superior to the ordinary least squares (OLS) estimator in identifying the existence of heteroskedasticity, serial, and cross-sectional correlations by systematically predicting the huge error covariance matrix (Bai et al., 2020).

4. Empirical Analysis and Presentation of Results

The presentation as well as the evaluation of the data, as well as the explanation of the study's numerous conclusions, are all covered in this section. The panel feasible/estimated generalised least squares (FGLS/EGLS) regression approach was used to achieve the study's ultimate goal.

4.1 Descriptive Statistics

Averaging US$10.61 billion, US$27.27 billion, 77.03%, 56.60%, US$3700, and 7.71%, respectively, were the health-related net official flows from the World Health Organisation, domestic general government health expenditure per capita, and the percentage of people without access to health services. Additionally, it was discovered that the shares of people without access to health services in addition to income poverty were negatively skewed (distributed with larger increases and fewer decreases), while domestic general government health expenditure per capita, per capita income, and unemployment rate were positively skewed or skewed to the right (distributed with infrequent increases over time).

Additionally, health-related net official flows from the World Health Organisation, domestic general government health expenditure per capita, per capita income, and unemployment rate all had excess kurtosis values that were higher than 3, indicating leptokurtic behaviour (presence of larger outliers), whereas the percentage of the population without access to health services and income poverty had low kurtosis values (less than 3), indicating platykurtic behaviour (presence of smaller outliers). The descriptive statistics of the variables below are shown in Table 3.

Table 3: Descriptive Statistics

	Health oriented net official development assistance from World Health Organization	*Domestic general government health expenditure per capita*	*Proportion of people with no access to health services*	*Income poverty*	*per capita income*	*Unemployment rate*
Mean	10.61	27.27	77.03	56.60	3.70	7.71
Median	9.76	12.31	76.95	66.67	3.13	5.22
Maximum	77.91	326.80	113.94	112.59	12.88	29.71
Minimum	0.00	0.00	24.25	0.00	0.00	1.55
Std. Dev.	12.00	54.01	18.76	29.64	2.73	6.68
Skewness	1.57	3.88	-0.53	-0.17	1.79	1.65
Kurtosis	7.39	18.14	2.89	2.32	6.57	5.09

Source: *Author's Computation using E-views 12, 2023*

4.3 Results and Discussion

Essentially, the estimation results from the panel feasible/estimated generalized least squares (FGLS/EGLS) regression method are reported in Table 4. From the regression results, domestic general government health expenditure per capita exerted a statistically significant negative impact on health inequity in sub-Saharan Africa at 1% significance level ($\psi = -0.08, p < 0.01$). Specifically, the result implies that, *ceteris paribus*, when there is a unit increase in domestic general government health expenditure per capita across SSA countries, there will be a corresponding 0.08 unit decrease in the proportion of people who can not access quality healthcare services in the region.

The implication of this finding is that, domestic general government health expenditure per capita serves as a positive stimulant in promoting health equity in sub-Saharan Africa. This is because, increase in the budgetary allocation for domestic general government health expenditure per capita in an economy is expected to boost availability of finanaical, human and material resources which will be used to provide relevant healthcare facilities and affordable medical services that can be accessed by all, irrespective of age, gender, social class, ethnicity, religion, etc. This result corroborate the findnigs of Swope and Hernández (2019), who used social security from governemnt as a proxy for govrnemt expenditure, American Academy of Family Physicians (2019), who used general governance as well as Nutbeam and Lloyd (2021), who argue that current government spending on interventions programmes can help in refining and stimulating health literacy particularly as it relates to individuals with higher-risk.

Also, from the regression result, income per capita exerted a statistically significant negative impact on health inequity in sub-Saharan Africa at 1% significance level ($\Upsilon = -1.61, p < 0.01$). Specifically, the result implies that, *ceteris paribus*, when there is a unit increase in income per capita across SSA countries, there will be an improvement in the welfare of the individual, which will in turn cause a corresponding 1.61units decrease in the proportion of people who cannot access quality healthcare services in the region. This means that a rise income per capita can be used to enhance health equity in SSA. This is because, when a country finds it difficult to achieve a stable income per capita to meet the the daily needs of its citizens, this will weaken the economic welfare of its citizens which, in turn, weakens their ability to finance their daily healthcare and welbeing needs, thus reducing access to good and quality healthcare services in the society. This finding supports earlier findings by Adler, Glymour, and Fielding (2016) and Moonesinghe, Bouye, and Penman-Aguilar (2014), who contend that inequalities in access to healthcare services are caused by a combination of risk factors including inequitable distribution of

wealth as well as low financial resources, and that the entitlement to healthcare services requires more careful consideration of social factors that are the cause of inequality in health such as one's financial status in society.

Furthermore, the regression results also revealed that unemployment rate exerted a statistically significant positive impact on health inequity in sub-Saharan Africa at 1% significance level ($\alpha = 0.10, p < 0.01$). Specifically, the result implies that, *ceteris paribus*, in SSA nations, for every unit rise in the percentage of the labour force that is unemployed and looking for place of employment, there will be a 0.10-unit increase in the percentage of persons who cannot afford excellent healthcare services in the area.. This means that, just like income poverty, a rise unemployment rate serves as a trigger to health inequity in SSA. This is due to the fact that, when individuals find it difficult to find a stable job that will fetch them the needed income to meet their daily needs, they will also be unable to meet their daily healthcare and welbeing needs, thus reducing access to good and quality healthcare services in the society. This reesult is in agreement with the findings of Baciu, et al. (2017) and Adler, Glymour and Fielding (2016), who noted, *inter alia*, that, employment, working conditions and socioeconomic status are key determinants of health equities across nations.

In addition, the regression results showed income poverty exerted a statistically significant positive impact on health inequity in sub-Saharan Africa at 1% significance level ($\omega = 0.04, p < 0.01$). Specifically, the result implies that, *ceteris paribus*, when there is a unit increase in the proportion of population living below US$1.25 a day across SSA countries, there will be a corresponding 0.04 unit rise in the proportion of people who cannot access quality healthcare services in the region. This means that a rise income poverty tends to trigger health inequity in SSA. This result validates earlier findnigs of Adler, Glymour and Fielding (2016) and Moonesinghe, Bouye and Penman-Aguilar (2014) that when individuals find it difficult to access US$1.25 a day, they will be unable to meet their daily nutritional, healthcare and welbeing needs, thus reducing access to good and quality healthcare services in the society.

From the regression results, health oriented net official development assistance from World Health Organization exerted a statistically significant negative impact on health inequity in sub-Saharan Africa at 1% significance level ($\varphi = -0.06, p < 0.01$).

Specifically, the result implies that, *ceteris paribus*, when there is a unit increase in health oriented net official development assistance from WHO to sub-Saharan African countries, there will be a corresponding 0.06 unit decrease in the proportion of people who cannot access quality healthcare services across the region. The implication of this finding is that, health oriented net official development assistance from World Health Organization is instrumental to solving the challenge of health inequity in sub-Saharan Africa. This result is justified by the fact that, when the World Health Organization increases its health oriented development assistance, and these resourses are properly managed by the various recipients across the SSA economies, this will boost the availability of finanaical, human and material resources, which will be used to provide adequate and affordable healthcare facilities and medical services that can be accessed by all citizens in the economy. Thus, the percentage of the general population who have access to health services will rise, confirming Gutema and Damen's (2016) discovery that health development aid comes with a statistically significant beneficial effect on accessibility to excellent medical care, given the fact that a one percentage point rise in health development assistance per capita can prevent the deaths of an average of two infants for every 1,000 live births.

Interestingly, all the empirical results reported in this study are in consonant with theoretical apriori expectation. Lastly, the result showed that, about 96% of the systematic changes in health inequity in sub-Saharan Africa can be attributed to the cummulative effects of World Health Organisation health-related net official flows, domestic general government health spending per person, poverty rates, income per capita, as well as the rate of unemployment, while about 4% of the remaining variations, is as a result of the error term. Thus, the above statistic further suggests that the model has a good fit. Also, the F-statistic value of 898.33 (prob.<0.001) shows that all the variables contained in the model are collectively important in the modelling of health inequity in sub-Saharan Africa. Table 4 summarises the estimation outcomes from the panel feasible/estimated generalised least squares (FGLS/EGLS) regression approach.

Table 4: Panel Data Estimation Results

Dependent Variable: HINEQ					
Method: Panel EGLS (Cross-section SUR)					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Apriori expected sign
C	93.42***	0.55	171.30	0.00	
GEXP	-0.08***	0.01	-11.84	0.00	Supported
PCI	-1.61***	0.11	-14.67	0.00	Supported
UNEMP	0.10***	0.02	5.30	0.00	Supported
INPOV	0.04***	0.00	14.27	0.00	Supported
AIDWHO	-0.06***	0.01	-8.45	0.00	Supported
R-squared	0.96	F-statistic		898.33	
Adjusted R-squared	0.96	Prob(F-statistic)		0.00	

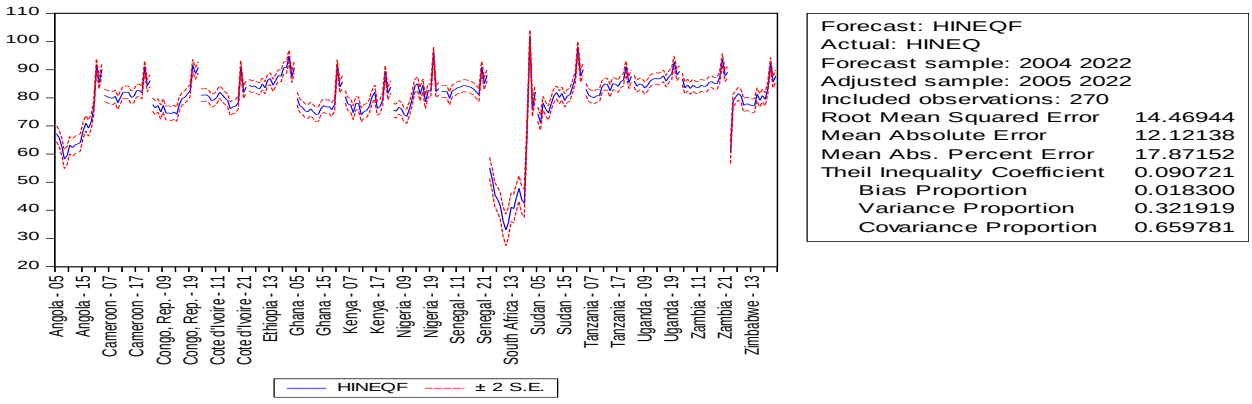
NB: *** indicates significant at 1%.

Source: Author's Computation using E-views 12, 2023

4.4 Health Inequality Forecast

The study simulated the proportion of people in the SSA region who cannot access quality healthcare services with adjustments to health-oriented assistance from the WHO, domestic general health spending by the government per capita, poverty rates, income per capita, along with rate of unemployment, in order to assess the robustness of the estimates generated above. Theil index, a statistic used to gauge economic inequality, was utilised in the research to accomplish this objective. The Theil index calculates the population's entropic "distance" from the "ideal" egalitarian society where everyone has equal access to welfare in the state (US Census Bureau, 2021). Interestingly, Figure 2 indicated that the forecasted health inequity (HINEQF) is within the ±2 standard error boundary. Specifically, the Theil inequality index of 0.09 indicates that the estimates are valid and acurate because as this index approaches zero, the more accurate is the forecast process presented in Figure 2.

Figure 2:



Source: Author's Computation using E-views 12, 2023

5. Conclusion and Recommendations

5.1 Conclusion

Using panel data from fifteen (15) sub-Saharan African countries spanning the years 2004 to 2022, this paper investigated the factors that affect health equity in the region. The panel feasible/estimated generalised least squares (FGLS/EGLS) regression technique was used in the empirical analysis. According to the regression results, domestic general public health spending per capita, income per capita, and health-oriented net official development assistance from the World Health Organisation each had a negative and statistically significant effect on the health inequality in sub-Saharan Africa at the 1% significance level, whereas the rate of unemployment and income poverty had a statistically significant positive impact on health inequity in sub-Sahara Africa at 1% significance level, respectively in the period of analysis.

The inference that can be drawn from the various empirical results of this study is that, for all citizens in SSA countries to achieve greater access to quality healthcare facilities and affordable medical services, irrespective of age, gender, social class, ethnicity, religion, etc., there is an urgent need for policy makers in the SSA region to pay greater attention to budgetary allocations to the health sector for the provision of health insurance and quality and affordable healthcare services. This further calls for the formulation of workable, active, measurable, and employment-based policies across the SSA region aimed at creating stable and profitable jobs for the unemplyed and under-employed masses. This can be achieved through creation of industries and revival of moribond ones, to boost national productivity and per capita income of the citizenry.

The findings further call for finacial support for self-employed individuals who have feasible business ideas that can fetch incomes for them, and lift them out of income poverty. This further necessitates the efficient and equitable utilisation of health oriented development assistance from WHO to sub-Saharan African countries for effective implementation of healthcare intervention programmes that will help achieve a wider coverage of quality and available healthcare services which is instrumental to both social well-being and development for all (Dover and Belon, 2019; Clark, *et al*, 2020).

5.2 Recommendations

On the basis of the foregoing, findings, the study proffers the following policy recommendations: First, the study recommends that sub-Saharan African countries should strengthen their budgetary allocations to the health and humanitarian sectors so as to make adequate resources available to provide the basic health and nutritional needs especially for the severely disadvantaged households who cannot afford basic healthcare needs.

Secondly, given the fact that unemployment and poverty are positively correlated, African community should devise means to create more jobs for her teeming population so as to reduce the growing level of poverty while ensuring that people are able to access the basic health services in the region at large. All employment policies should be reviewed to mitigate institutionally-induced poverty and health inequities in the region.

Also, health oriented net official flows from world health organization should be properly utilised in providing quality, available and affordable healthcare services to help reposition the SSA region's health sector.

Lastly, given the inverse relationship between, income per capita and poverty, SSA community should boost its productive base so as to raise per capita income which will in turn reduce the poverty level in the region. This will ultimately help to fight against the rising spate of health inequity in the region.

References

Abegunde, D., & Stanciole, A. (2006). An estimation of the economic impact of chronic noncommunicable diseases in selected countries. *World Health Organization, Department of Chronic Diseases and Health Promotion, 2006*.

Adler, N. E., Glymour, M. M., & Fielding, J. (2016). Addressing social determinants of health and health inequalities. *Jama*, *316*(16),1641-1642.

Akinyele, O. D., Oloba, O. M., & Mah, G. (2022). Drivers of unemployment intensity in sub-Saharan Africa: do government intervention and natural resources matter? *Review of Economics and Political Science*, *8*(3), 166–185. https://doi.org/10.1108/reps-11-2020-0174

Alabi, A. W., & Olaoye, F. O. (2022). The Effect of Technology Adoption on Financial Inclusion: A Cross-country Panel Analysis between China and Nigeria. *European Journal of Business and Management Research*, *7*(2). https://doi.org/10.24018/ejbmr.2022.7.2.1314

American Academy of Family Physicians. (2019). Advancing health equity by addressing the social determinants of health in family medicine (position paper).

Amponsah, A., & Amuasi, J. H. (2020). *Evaluation of clinical preventive services in primary health facilities within the Kumasi metropolis* (Doctoral dissertation).

Baciu, A., Negussie, Y., Geller, A., Weinstein, J. N., & National Academies of Sciences, Engineering, and Medicine. (2017). The root causes of health inequity. In *Communities in action: Pathways to health equity*. National Academies Press (US).

Bai, J., Choi, S. H., & Liao, Y. (2020). Feasible generalized least squares for panel data with cross-sectional and serial correlations. *Empirical Economics*, *60*(1), 309–326. https://doi.org/10.1007/s00181-020-01977-2

Braveman P, Arkin E, Orleans T, Proctor D, & Plough A. (2017). What is Health Equity? Robert Wood Johnson Foundation. Published on May 1, 2017. Retrieved from https://www.rwjf.org/en/library/research/2017/05/what-is-health-equity-.html.

Brennan-Ramirez, L. K., Baker, E. A., & Metzler, M. (2008). Promoting health equity; a resource to help communities address social determinants of health. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2008. Retrieved from https://stacks.cdc.gov/view/cdc/11130.

Buss, P. M., Fonseca, L. E., Galvão, L. A. C., Fortune, K., & Cook, C. (2016). Health in all policies in the partnership for sustainable development. *Revista Panamericana de Salud Pública*, *40*, 186-191.

Byaro, M., Mafwolo, G., & Ngereza, C. (2023). Does unemployment in sub-Saharan Africa have asymmetric effects on health? A panel quantile approach. *The Journal of Economic Asymmetrie*, *28*(2023), e00316–e00316. https://doi.org/10.1016/j.jeca.2023.e00316

Chapman, A. R. (2010). The social determinants of health, health equity, and human rights. *Health and Hum. Rts.*, *12*, 17.

Chukuezi, C. (2010). Socio-cultural factors associated with maternal mortality in Nigeria. *Research Journal of Social Sciences*, *1*(5), 22-26.

Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., ... & Costello, A. (2020). A future for the world's children? A WHO–UNICEF–Lancet Commission. *The Lancet*, *395*(10224), 605-658.

Cockerham, W. C. (2021). *The Social Causes of Health and Disease*. John Wiley and Sons.

David, R., and Collins, J. W. (2021). Why does racial inequity in health persist?. *Journal of Perinatology*, *41*(2), 346-350.

Dover, D. C., & Belon, A. P. (2019). The health equity measurement framework: A comprehensive model to measure social inequities in health. *International journal for equity in health*, *18*(1), 1-12.

Eze, P., Lawani, L. O., Agu, U. J., & Acharya, Y. (2022). Catastrophic health expenditure in sub-Saharan Africa: systematic review and meta-analysis. *Bulletin of the World Health Organization*, *100*(05), 337–351J. https://doi.org/10.2471/blt.21.287673

Gardner, L. (2022, January 17). *Changing the narratives on Sub-Saharan Africa's failure to develop | LSE Research*. Www.lse.ac.uk. https://www.lse.ac.uk/research/research-for-the-world/race-equity/changing-the-narratives-on-sub-saharan-africas-failure-to-develop

Gil-Alana, L. A., Mudida, R., & Zerbo, E. (2021). GDP per capita IN SUB-SAHARAN Africa: A time series approach using long memory. *International Review of Economics and Finance*, *72*, 175–190. https://doi.org/10.1016/j.iref.2020.12.008

Gutema, N., & Damen, H. M. (2016). Effect of health development assistance on health status in sub-Saharan Africa. *Risk Management and Healthcare Policy*, *9*(2016), 33. https://doi.org/10.2147/rmhp.s101343

International Monetary Fund (IMF). (2022, October). *Report for Selected Countries and Subjects-World Economic Outlook database: October 2022*. IMF. https://www.imf.org/en/Publications/WEO/weo-database/2022/October/weo-report?c=612

Jayasinghe, S. (2015). Social determinants of health inequalities: towards a theoretical perspective using systems science. *International Journal for Equity in Health*, *14*(1), 1-8.

Kim, M.-H., & Lee, J. (2013). Current status of policy developments in tackling health

inequalities and the next steps to be taken in Korea. *Journal of the Korean Medical Association*, *56*(3), 206. https://doi.org/10.5124/jkma.2013.56.3.206

Krieger, N., Rehkopf, D. H., Chen, J. T., Waterman, P. D., Marcelli, E., & Kennedy, M. (2008). The fall and rise of US inequities in premature mortality: 1960-2002. *PLoS Medicine*, *5*(2), e46. https://doi.org/10.1371/journal.pmed.0050046

Kühn, S., & Rieger, U. M. (2017). Health is a state of complete physical, mental and social well-being and not merely absence of disease or infirmity. *Surgery for Obesity and Related Diseases*, *13*(5), 887.

Lathrop, B. (2020). Moving toward health equity by addressing social determinants of health. *Nursing for women's health*, *24*(1), 36-44.

Lee, I. J., & Ahmed, N. U. (2021). The Devastating Cost of Racial and Ethnic Health Inequity in the COVID-19 Pandemic. *Journal of the National Medical Association*, *113*(1), 114-117.

Lee, S. (2021). COVID-19 Amplifiers on Health Inequity Among the Older Populations. *Frontiers in Public Health*, *8*, 996.

Lilley, A., Lilley, M., & Rinaldi, G. (2020). Public health interventions and economic growth: Revisiting the Spanish flu evidence. *Available at SSRN 3590008*.

Marmot, M., Allen, J., Bell, R., Bloomer, E., & Goldblatt, P. (2012). WHO European review of social determinants of health and the health divide. *The Lancet*, *380*(9846), 1011-1029.

McCartney, G., Collins, C., & Mackenzie, M. (2013). What (or who) causes health inequalities: Theories, evidence and implications? *Health Policy*, *113*(3), 221–227. https://doi.org/10.1016/j.healthpol.2013.05.021

Micah, A. E., Chen, C. S., Zlavog, B. S., Hashimi, G., Chapin, A., & Dieleman, J. L. (2019). Trends and drivers of government health spending in sub-Saharan Africa, 1995–2015. *BMJ Global Health*, *4*(1), e001159. https://doi.org/10.1136/bmjgh-2018-001159

Moonesinghe, R., Bouye, K., & Penman-Aguilar, A. (2014). Difference in health inequity between two population groups due to a social determinant of health. *International Journal of Environmental Research and Public Health*, *11*(12), 13074-13083.

Mumuni, S., & Mwimba, T. (2022). *Modeling the impact of green energy consumption and natural resources rents on economic growth in Africa: An analysis of dynamic panel ARDL and the feasible generalized least squares estimators*. *11*(1). https://doi.org/10.1080/23322039.2022.2161774

Myers, H. F. (2009). Ethnicity-and socio-economic status-related stresses in context: an integrative review and conceptual model. *Journal of behavioral medicine*, *32*(1), 9-19.

Navarro, V., Muntaner, C., Borrell, C., Benach, J., Quiroga, A., Rodríguez-Sanz, M., Vergés, N., & Pasarín, M. I. (2006). Politics and health outcomes. *Lancet (London, England)*, *368*(9540), 1033–1037. https://doi.org/10.1016/S0140-6736(06)69341-0

Nutbeam, D., & Lloyd, J. E. (2021). Understanding and responding to health literacy as a social determinant of health. *Annual Review of Public Health*, *42*. Available at https://doi.org/10.1146/annurev-publhealth-090419-102529.

Porter, M. E. (2010). What is value in health care. *N Engl J Med*, *363*(26), 2477-2481.

Rahman, M., Ahmed, R., Moitra, M., Damschroder, L., Brownson, R., Chorpita, B., ... & Kumar, M. (2020). Mental distress and human rights violations during CoViD-19: a rapid review of the evidence informing rights, mental health needs, and public policy around vulnerable populations. Frontiers in psychiatry, 11.

Renzaho, A. (2020). The need for the right socio-economic and cultural fit in the COVID-19 response in Sub-Saharan Africa: examining demographic, economic political, health, and socio-cultural differentials in COVID-19 morbidity and mortality. *International Journal of Environmental Research and Public Health*, *17*(10), 3445.

Saidi, Y., Mohamed Ali Labidi, & Ochi, A. (2023). Economic Growth and Extreme Poverty in Sub-Saharan African Countries: Non-Linearity and Governance Threshold Effect. *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-023-01421-7

Schoch, M., & Lakner, C. (2020, December 16). *The number of poor people continues to rise in Sub-Saharan Africa, despite a slow decline in the poverty rate*. Blogs.worldbank.org. https://blogs.worldbank.org/opendata/number-poor-people-continues-rise-sub-saharan-africa-despite-slow-decline-poverty-rate

Selassie, A. A., & Hakobyan , S. (2021, April 15). *Six Charts Show the Challenges Faced by Sub-Saharan Africa*. IMF. https://www.imf.org/en/News/Articles/2021/04/12/na041521-six-charts-show-the-challenges-faced-by-sub-saharan-africa

Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., ... & Committee on Early Childhood, Adoption, and Dependent Care. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232-e246.

Solar, O. & Irwin, A. (2007) A conceptual framework for action on the social determinants of health. Discussion paper for the commission on social determinants of health. World Health Organization, Geneva. http://en.scientificcommons.org/23007732

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health*. WHO Document Production Services.

Swope, C. B., & Hernández, D. (2019). Housing as a determinant of health equity: A conceptual model. *Social Science and Medicine*, *243*, 112571.

The World Bank. (2022, April 13). *Africa Overview*. World Bank. https://www.worldbank.org/en/region/afr/overview

Tseng, M. H., & Wu, H. C. (2021). Accessibility Assessment of Community Care Resources Using Maximum-Equity Optimization of Supply Capacity Allocation. *International Journal of Environmental Research and Public Health*, *18*(3), 1153.

United Nations Development Programme (UNDP, 2021). Goal 3: Good health and well-being. Available at https://www.undp.org/content/seoul_policy_center/en/home/sustainable-development-goals/goal-3-good-health-and-well-

US Census Bureau . (2021, October 8). *Theil Index*. Census.gov; U.S. Department of Commerce. https://www.census.gov/topics/income-poverty/income-inequality/about/metrics/theil-

Weil, A. R. (2020). Tackling Social Determinants of Health Around the Globe: A global health equity movement relies upon research showing how social factors affect health. *Health Affairs*, *39*(7), 1118-1121.

World Bank (2013a). *Long-Term Investment Financing for Growth and Development: Umbrella Paper* (February 2013) http://en.g20russia.ru/news/20130228/78124 5645.html and http://en.g20russia.ru/load/781245667

World Bank (2013b). *Financing for Development* (October 2013). http://www.worldbank.org/content/dam/Worldbank/document/Povertydocuments/WB-PREMfinancing-for-development-pub-10-11-13web.pdf

World Bank (2019). World development indicators of the World Bank. Retrieved from data, worldbank.org.

World Health Organization (2014). *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health*. Available online: http://www.who.int/social_determinants/thecommission/finalreport/en/.

World Health Organization (2015). *WHO global strategy on people-centred and integrated health services: interim report* (No. WHO/HIS/SDS/2015.6). World Health Organization.

World Health Organization (2017). *Health is a fundamental human right*, Human Rights Day 2017. Published on 10 December 2017. Retrieved from https://www.who.int/news-room/commentaries/detail/health-is-a-fundamental-human-

World Health Organization (2020). Health Equity Monitor: Compendium of Indicator Definitions. July 2020. Retrieved from https://cdn.who.int/media/docs/default-source/gho-documents/health-equity/health-equity-indicator-compendium-vjuly2020.pdf?sfvrsn=927c7420_2

World Health Organization (2023). *Social determinants of health*. Retrieved from https://www.who.int/health-topics/social-determinants-of-health#tab=tab_2

World Health Organization (WHO) (2013). A state of complete physical mental and social well-being and not merely the absence of disease or infirmity. 2013.

World Health Organization (WHO). (2006). A State of Complete Physical Mental and Social Well-being and Not Merely the Absence of Disease or Infirmity: Constitution of the World Health Organization Basic Documents.

World Health Organization. (2010). *Monitoring Equity in Access to AIDS Treatment Programmes: A Review of Concepts, Models, Methods and Indicators*. World Health Organization.