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HEALTH EXPENDITURE AND HEALTH OUTCOMES RELATIONSHIP: THE CASE IN WEST AFRICAN COUNTRIES

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ABSTRACT

Objective: The study investigated the relationship between health expenditure and population health outcomes in West African Countries proxied by life expectancy at birth, infant mortality rate, Under-five mortality rate, and crude mortality rate.

Material and Methods: We employed the feasible generalized least square (FGLS) estimation technique for a panel of 15 countries with data ranging from 1996 to 2021, collected from the websites of the World Development Indicators and World Governance Indicators.

Results: The study has indicated that public and private health expenditures in the West African region improve the population's health outcomes.

Conclusion: We also recommended that governments make conscious efforts to allocate more resources to the health sector as the improvement in health outcomes contributes to countries' economic growth and to achieve Sustainable Development Goal 3 (good health and well-being). We also recommend that governments in West Africa fully implement Universal Healthcare Coverage (UHC) to alleviate high poverty levels and health expenses for people to be able to afford their health expenses. The implementation of the UHC will help protect individuals against ill health and cushion their income levels in the event of illness.

Keywords: Health expenditure, health outcomes, Feasible Generalized Least Square, West African Countries.

1. INTRODUCTION

Poor health reduces human capacity, and resources and makes most people less able to cope with life. It also has consequences on the economy by impeding human capital, reducing returns to education, hampering the gross national product (GNP), and limiting entrepreneurial activities. So, investing in the health sector is fundamental for each country or the West African region to implement an effective health policy. Despite the financial difficulties faced by States, they are committed to improving individuals' health status by increasing health spending to achieve the sustainable development goal (SDGs_3, 2020). Indeed, better health is the backbone of economic development and therefore countries are making endeavors to meet SDG Goal 3 to back up their development process (Ayomide et al., 2022). In addition, a commitment was shown in 2000, to the Millennium Development Goals (MDGs), to boost economic growth, and human resources through poverty alleviation, health improvement, promotion of education, etc. by 2015 (WHO, 2005). Furthermore, countries also showed commitment to improving population health status through the Abuja Declaration in 2001. Through the latter, States were committed to allocating at

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least 15% of the national budget by 2015 to the health sector. However, till now in the West African States, only Liberia (18.9%) and Togo (15.4%) have reached this target (Novignon and Lawanson, 2017).

Over the years, in West African countries, as low-income countries, many households do not have health insurance. Informal payment for health services is still going on, showing the low health spending done by the government to enhance affordable healthcare services for the poorest people (WHO, 2019). This informal payment represents 10% to 45% of the out-of-pocket payment in the region. In addition, according to Yoboyi (2020), on average, West African countries only allocate 7.7% of their national budget to the health sector, revealing the low health spending in West Africa: well below the Abuja Abuja Declaration of allocating at least 15% of budgets to the health sector. Furthermore, most West African countries are categorized by low Human Development Index and are principally affected by malaria, which costs over 132 billion dollars annually in the region (Sango-Coker and Bein, 2018). Additionally, in ECOWAS, as compared to other regions, the life expectancy in West Africa was estimated in 2019 at 57.9 years, about 14.7 years lower than the Northern Africa region (72.6 years), and about 6.9 years lower than the healthy life expectancy in the Eastern Africa region (64.8 years) because countries are still facing with high mortality rates, extreme poverty, hunger, high level of illiteracy, etc. In 2022, on average, the crude death rate in Africa was about 8.4 deaths per 1,000 people. Therefore, West African countries are still far from meeting the target of improving population health status (Yaya et al., 2020). However, according to Olufemi et al (2019), between 2001 and 2015 in African countries, government expenditure (% of GDP) was respectively 5.52 and 5.49, while it slightly increased by 4% on average up to 5.73 during the period indicating. The majority of empirical investigations on health spending and health outcomes relationship provide contradictory findings. Therefore, this study seeks to reinvestigate the health expenditures and population health outcomes relationship in the West African region. To address econometric problems like heteroscedasticity, autocorrelation, and cross-sectional dependency, the study employs the feasible generalized least squares. Data is also collected from the World Development Indicators of the World Bank from 1996 to 2021.

2.LITERATURE REVIEW

Various studies on health spending and population health outcomes relationship found different and contradictory results. Increasing health spending is not always followed by health outcomes improvement. Sango-Coker and Bein (2018) showed that there is a positive relationship between public healthcare spending and life expectancy, while they found a negative relationship between private healthcare spending and life expectancy. However, Oluwatoyin et al (2015) pointed out that a one-unit increase in public health expenditure and carbon dioxide emission will lead to a 0.38 and 2.39 decrease in life expectancy respectively, due to the wrong channeling of funds and the practices of corruption of the leaders adding to the problem of brain drain and frequent strikes by health officials. They recommend that the government should introduce programs that will raise awareness concerning the effect of carbon dioxide emissions on people's health should draw people and industries' attention to how to deal with it and should increase and restructure the public expenditure allocation to the health sector. Also, for Onofrei et al (2021) an increase in government health expenditure improves life expectancy at birth, while for Edeme et al. (2017); Edeme and Olisakwe (2019), it reduces infant mortality rate, and for Oluwaseun (2019) and Azuh et al (2020),

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increasing public health spending will reduce infant mortality by 2.4 percent, under-five mortality by 3.9 percent, and maternal mortality by 4.9 percent.

Nevertheless, Eboh et al (2022), showed that there is a negative and insignificant impact of government health expenditure on under-five child mortality. They also found that government capital expenditure had a negative and insignificant impact on under-five mortality, while government recurrent expenditure had a negative and significant impact on under-five mortality. Therefore, they recommended that the key to good health outcomes is dependent not only on an increase in the yearly budgetary allocation to the health sector but also on implementing a public finance system that is good enough to extend and possibly link particular expenditure and revenue decisions and ensure appropriate usage of the allocated fund as transparently as possible. In the same line, Munteh and Fonchin (2020), revealed that public health expenditure has a negative but insignificant effect on under-5 mortalities when full immunization coverage rates and poverty rate indicators are included. For them, achieving the SDG-3.2 target in Cameroon may be unattainable if the levels of poverty and immunization coverage rates are not considerably improved.

Other studies reveal such Logarajan et al.(2020) found that health spending has no significant impact on health status. The authors revealed that public and private health expenditures have no impact on the under-five mortality rate in Malaysia. Importantly, out-of-pocket health expenditure deteriorates the under-five mortality rate in Malaysia. Therefore, effective health financing safety may be an option to ensure an imperative child health outcome. Additionally, Oyedele (2017) showed that healthcare expenditure mainly the out-of-pocket payment has no significant effect on both infant mortality and under-five mortality. In addition, Gupta et al (2016) pointed out-of-pocket payment worsens the population's standard of living and health status. However, Qin et al. (2019) argue that there is a modest relationship between a reduction in user charges and improvements in health outcomes, but this depends on the health outcomes measured, the populations studied study quality, and policy settings.

Numerous studies have explored the connection between health spending and its outcomes (Oluwatoyin et al.2015; Sango-Coker and Bein, 2018; Onofrei et al. 2021) and considering the distinct effects of public and private health expenditure on health outcomes (Gupta et al. 2016; Oyedele, 2017; Munteh and Fonchin, 2020; Logarajan et al.2020), additional research is warranted to gain a more accurate understanding of these divergent findings.

This paper differs from prior research in several aspects. First, it uses a new empirical approach by examining the West African region concerning the relationship between health expenditures and population health outcomes. In addition, most of the previous studies are mainly focused on infant, maternal, and under-five mortality rates, overlooking key indicators like life expectancy and crude mortality. Second, we utilize the most up-to-date data to explore the relationship between healthcare expenditures and health outcomes. Finally, we employed the feasible generalized least squares to analyze this connection, considering both cross-sectional and time series perspectives. As a result, this study aims to investigate the effect of public and private health expenditures on population health outcomes, as reflected in crude mortality rates infant mortality, under-five mortality rates, and life expectancy at birth within the West African region

3. MATERIALS AND METHODS

3.1 Dependent Variables

This study focuses on evaluating population health outcomes (Ho), which encompass life expectancy at birth, infant mortality, under-five mortality, and crude mortality. These health

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outcomes are chosen to provide a comprehensive assessment of population health in the West African region, and their selection allows for meaningful comparisons with prior research findings. "Life expectancy" in this context refers to the average number of years a person is expected to live, not due to illness or accident, but due to natural aging (GBD and HALE, 2015). The crude death rate is the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. The millennium development objectives and the current sustainable development goals reflect this. The crude death rate of a country is typically regarded as an indicator of the overall health condition of its population. The infant mortality rate represents the number of infant deaths for every 1,000 live births, while the under-five mortality rate indicates the likelihood that a newborn will not survive to reach their fifth birthday, expressed as a rate per 1,000 live births (Eboh, Aduku, & Onwughalu, 2022).

They are widely recognized as some of the most reliable markers of child health and the overall state of primary healthcare (Bokhari et al., 2007). Furthermore, they represent the most comprehensive and well-assessed indicators of health status that have implications for the general well-being of a population. These aspects of population health status have garnered considerable attention from various stakeholders and researchers, particularly in developing nations such as West African countries. This attention is rooted in the belief that individuals in poor health can diminish the labor force available to the economy, potentially triggering a detrimental cycle of reduced productivity, sluggish economic growth, and limited development, all of which can further compromise the population's health (World Bank, 2020)

3.2 Independent Variables

Health expenditure encompasses both public and private investments in healthcare, serving as a measure of the commitment to developing human health capital. This study primarily delves into two aspects of health expenditure: government expenditure (public expenditure) as a percentage of the GDP and private expenditure (the ratio of private healthcare expenditure to total healthcare expenditure). The incorporation of these public and private health expenditure variables aims to shed light on their respective impacts on population health outcomes, particularly within the context of West African countries (Chireshe and Ocran, 2020). Additionally, in line with the perspective of Fayissa and Gutema (2008), both government and private outlays on healthcare are considered investments in health capital since they directly contribute to the health production system.

3.3 Control Variables

The control variables utilized in this study have been selected through a combination of factors, including insights from existing research, intuitive considerations, practicality, and data availability. They play crucial roles in the analysis:

Economic Success: We gauge economic prosperity by assessing per capita real income, often referred to as GDP. This choice is based on the premise that countries with robust economic performance are more inclined to allocate greater resources to public services, including healthcare. It is also presumed to influence the demand for medical care, serving as a potential regulator. We hypothesize that a country's healthcare system is likely to perform better as its per capita income increases, with per capita health expenditure potentially impacting the quality of

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care. Additionally, empirical studies have uncovered a direct positive correlation between increased medical care spending and improved health outcomes (Phelps et al., 2002).

Regarding education: the primary school completion rate for the population (Edu) is employed to represent the educational dimension. Education grants individuals greater access to health-related knowledge, which plays a pivotal role in the health production process. Existing empirical research consistently demonstrates that households with higher levels of education tend to experience better health (Mwabu, 2007). Educated households place a higher value on health, adapt their nutrition and lifestyles, and can effectively utilize health information and healthcare services.

The urban population rate serves as an indicator of the extent of urbanization, which is closely associated with the level of development. Urbanization typically results in the growth of towns and cities as people migrate from rural areas in search of employment opportunities in industry and the service sector, moving away from agriculture. Research has shown that geographical factors can significantly influence health outcomes (Baldacci et al., 2004). The rationale for including this variable in the model lies in the fact that urban areas are generally associated with a higher likelihood of encountering contagious diseases. Furthermore, residents of urban areas have easier access to healthcare facilities, which translates to lower private healthcare costs, including reduced transportation expenses and shorter travel times to reach medical services. Consequently, individuals in urban areas are more inclined to utilize healthcare facilities compared to rural residents who may lack access to adequate healthcare services.

Furthermore, we incorporated an indicator for access to safe drinking water sources, quantified by the percentage of the population with enduring access to safe drinking water sources. Substantial evidence underscores the influence of access to safe water facilities on health status, as documented in studies by Mishra and Newhouse (2009), Rajkumar and Swaroop (2008), and Houeninvo (2015).

Greenhouse gas emissions are employed as an indicator of environmental quality because poor environmental conditions have health ramifications due to pollution. This pollution can result in chronic respiratory diseases, cardiovascular issues, diabetes mellitus, and cancer among people. Additionally, it plays a pivotal role in driving climate change, which in turn triggers a multitude of health-related concerns (IPCC, 2018).

3.4 Model Specification

The model used in this study is guided by existing literature and delineates the effect of government expenditure and private health expenditure on health outcomes over some time. In terms of theoretical underpinnings, our research draws inspiration from the insights of Grossman (1972) and the framework presented by Fayissa and Gutema (2008). A simplified representation of the health outcomes model is as follows:

$$H_{o\,it}=\alpha_0+\alpha_1 H.exp_{it}+\alpha_2 Gdppc_{it}+\alpha_3 Edu_{it}+\alpha_4 SDwater_{it}+\alpha_5 Urban_{it}+\alpha_6 GhG_{it}+e_{it}$$

Where:

Ho: population health outcomes (Life expectancy at birth, infant mortality rate, under-five mortality rate, and crude mortality rate).

H.exp: Health expenditure (public and private health spending)

Gdppc: Gross Domestic Product per capita

Educ: Primary school completion rate

SD water: % of the population with access to safe drinking water.

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Urban: % of the population living in towns
GhG: Carbon dioxide (greenhouse gas) emissions
e_{it}: error term assumed to be normally distributed with zero means and constant variance.

Figure 2: Description of variables

Variables	Definition of variables/measurement	Sources
Life expectancy	The number of years an individual can expect to live at birth.	WDI
Crude mortality	The number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year.	WDI
Infant mortality	The probability of dying before one year, measured as number of deaths before one birthday per 1000 live births.	WDI
Under-five mortality	The probability of dying before the age of five, measured as number of deaths before fifth birthday per 1000 live births.	WDI
Public health spending	% of government expenditure on health care to GDP	WDI
Private health spending	% of private health care expenditure to total health care expenditure	WDI
GDP per capita	A measure of economic performance	WDI
Safe and drinkable Water	Measured by the percentage of the population with sustainable access to safe drinking water, sanitation, electricity, and roads.	WDI
Greenhouse gas emissions	Carbon dioxide emissions from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during the consumption of solid, liquid, and gas fuels and gas flaring	WDI
Urbanization rate	To capture the ratio of the population living in towns	WDI
Education	The primary school completion rate for the population	WDI
Source: Author's compilation		

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4. RESULTS

4.1 Estimation methods

Before running our panel model estimation, we first checked the cross-sectional dependency (CD test) through the Pesaran test to investigate the CD in the model's variables. It is well known that in the presence of cross-sectional dependency in variables, the results obtained from the estimation will be biased. We also checked the heteroscedasticity, the autocorrelation, and the panel unit root tests to ensure the use of the best estimation method.

In this study, we had cross-sectional dependency in variables, heteroscedasticity, autocorrelation, and the number of countries (N) is inferior to the number of years (T). Therefore, the best-fitted estimation method we used is the Feasible Generalized Least Squares (FGLS) instead of the fully modified ordinary least squares (FMOLS). The use of the generalized least squares estimator (GLS) directly takes into account heteroskedasticity, and cross-sectional and serial correlations in the estimation (Bai et al., 2020).

Table 1: Cross-sectional dependency test

Variables	CD-test	p-value
Log_Gross Domestic Product per capita	45.100	0.000***
Public health Expenditure	19.190	0.000***
Private health expenditure	24.80	0.000***
Access to safe and drinkable Water	25.870	0.000***
Log Greenhouse gas emission	24.210	0.000***
Primary school enrolment	7.760	0.000***
Life expectancy	50.660	0.000***
Infant mortality rate	51.530	0.000***
Under-five mortality rate	51.480	0.000***
Crude mortality rate	48.480	0.000***
Urbanization rate	50.680	0.090

Source: Author's compilation

Table 1 shows the results of the CD test for the variables of our model in the West African region from 1996 to 2021. The alternative hypothesis of this test was that cross-sectional dependency existed among the variables since the null hypothesis was rejected (p-value<0.05). As the table presents, except for the urbanization rate, all the variables had CD.

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Table2: Descriptive Statistics

Variable	Observation	Mean	Standard. Deviation	Min	Max
Gross Domestic Product per capita	390	912.042	732.887	138.714	3537.14
Public Health expenditure as a percentage of GDP	390	5.162	2.486	1.732	20.413
Private Health Expenditure as a percentage of health expend.	390	9.554	14.641	0.097	62.284
Life Expectancy at birth	390	57.455	6.383	42.071	77.708
Infant Mortality rate	390	70.716	27.259	9.704	158.5
Under-five Mortality rate	390	114.511	50.175	10.334	266
Crude Mortality rate	390	11.239	3.511	4.423	21.883
Primary school enrollment	390	60.001	20.799	13.854	105.993
Urbanization rate	390	40.609	11.494	15.407	67.102
Access to Safe and Drinkable Water	390	59.254	18.851	-11.919	121.468
Total greenhouse gas emission	390	30756.712	66382.616	360.482	332247.04
Source: Author, based on WGI and WDI (World Bank)					

4.2 Descriptive statistics

The average life expectancy (LE), infant mortality rate, under-five mortality rate, and crude mortality (Crude M) are respectively 57.45 years which is even less than 60 years and the maximum life expectancy in the region is 77.70years, which is still well below the average life expectancy in OECD countries (80 years), 70.71%, 114.51%, and 11.24%, while the proportion of public health care expenditure to GDP is 5.16% and the private health expenditure to the percentage of general public health spending on average is 9.554. The highest rate of infant mortality is 158.50% in the region and the highest rate of under-five mortality rate is 266 per 1000 live, which shows that for 1996 to 2021, the West Africa region reveals a low level of population health outcomes especially in term of infant and under-five mortality rate compare with 56 deaths in Sub-Saharan Africa, 30 deaths per 1000 lives in Northern Africa, and 6 per 1000 lives in OECD countries (UNICEF, 2019). The average urbanization rate is 40.609% whilst on average 59.254% of the population has access to safe and drinkable water. See Table 2 for more details.

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Table 3: Econometric results

VARIABLES	Life Expectancy at Birth		Infant Mortality rate		Under-five Mortality rate		Crude Mortality rate	
Log of GDP per capita	10.63***	10.59***	-41.95***	-48.51***	-57.71***	-61.67***	-4.239***	-4.522***
	(0.764)	(0.754)	(3.587)	(3.690)	(5.887)	(5.777)	(0.499)	(0.482)
Total greenhouse gas emissions	-4.413***	-4.410***	12.98***	17.30***	18.95***	23.90***	1.558***	1.761***
	(0.280)	(0.284)	(1.020)	(1.116)	(2.005)	(2.086)	(0.182)	(0.179)
Primary school enrollment	0.0936***	0.0900***	-0.348***	-0.446***	-0.851***	-0.934***	-0.0673***	-0.0658***
	(0.00908)	(0.00814)	(0.0387)	(0.0379)	(0.0671)	(0.0634)	(0.00582)	(0.00468)
Urbanisation rate	-0.304***	-0.320***	1.038***	1.484***	1.114***	1.467***	0.160***	0.160***
	(0.0293)	(0.0272)	(0.138)	(0.124)	(0.233)	(0.197)	(0.0213)	(0.0175)
Safe and Drinkable water Access	0.284***	0.295***	-1.046***	-1.168***	-2.080***	-2.082***	-0.166***	-0.162***
	(0.0176)	(0.0173)	(0.0883)	(0.0844)	(0.146)	(0.141)	(0.0121)	(0.0112)
Current health expenditure as a percentage of GDP	0.159***		-1.514***		-1.228**		-0.0327	
	(0.0615)		(0.255)		(0.462)		(0.0368)	
Domestic private health expenditure as a percentage of current health expenditure		0.0312***		-0.263***		-0.340**		-0.0218**
		(0.00666)		(0.0382)		(0.0570)		(0.00431)
Constant	32.66***	33.50***	192.4***	196.0***	350.9***	344.9***	25.47***	26.04***

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	(1.619)	(1.496)	(7.197)	(7.182)	(11.97)	(10.93)	(1.052)	(0.971)
Observations	390	390	390	390	390	390	390	390
Number of countries	15	15	15	15	15	15	15	15

Source: Author, based on WGI and WDI dataset, Stata 14 *** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the results of the impact of public and private health expenditure on selected health outcomes in the West African States. The results displayed in the above table are discussed in the next session.

5. DISCUSSIONS

Our study findings indicate that public health expenditure and private health expenditure within the West African health sector exhibited a noteworthy positive correlation with life expectancy but a negative influence on mortality rates. Consequently, augmenting investments in both public and private health spending within the healthcare sector leads to an improvement in life expectancy and a reduction in mortality rates. Clear, we find that a 1% increase in public health spending averagely increases life expectancy by 0.16 years (1 month 26 days), and reduces infant mortality rate, and under-five mortality rate respectively by 1.51%, and 1.23%. however, though not significant, it contributes to lowering the crude mortality rate in the region. In addition, increasing private health expenditure by 1% will result in an increase in life expectancy by 0.03 years (11 days) and a decrease in infant mortality, under-five mortality, and crude mortality rate by 0.26%, 0.34%, and 0.02% respectively. These results are in the same line with Rezapour et al. (2019), and Bein et al. (2017) findings who identified increasing healthcare expenditures improve health status. For them. Health outcomes improvement results from the increase of health expenditure especially public expenditure in the presence of good institutions in place to ensure the efficient use of resources, which is the case in the West African region. Good institutions help to use efficiently resources allocated to health services delivery by avoiding other misallocations (World Bank, 2003).

Other variables such as Gross Domestic Product per capita, urbanization rate, and access to safe and drinkable water are all significant at 1% and contribute to reducing the mortality rates in the region and improving the population life expectancy in West African countries, while the increased in greenhouse gas emission worsen the selected health. This outcome implies that as GDP per capita rises, governments are better able to allocate increased resources to the healthcare sector. This, in turn, enhances the affordability of crucial health services for households, ultimately resulting in reduced crude mortality rates and an extended life expectancy. Specifically, a 1 percent increase in GDP per capita leads to a 10.63-year increase in life expectancy, a 41.95% decrease in infant mortality rate, a 57.71% decrease in infant mortality rate, and a 4.24% decrease in crude mortality in West Africa. This finding is consistent with the findings of Arthur and Oaikhenan (2017) and Gupta, Verhoeven, and Tiongson(2002). Therefore, an increase in income (GDP per capita) improves health outcomes especially life expectancy, infant mortality rate, under-five mortality, and crude mortality because it offers governments the ability to invest in healthcare and increases the purchasing power of households to afford essential health services.

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Keeping all other independent variables constant, an average 1% increase in the urban population is associated with a 0.304-year decrease in life expectancy, an increase in infant mortality rate, under-five mortality, and crude mortality rates by 1.05%, 2.08%, and a 0.166% respectively. Our findings closely align with those of Edeme et al. (2017). This correlation can be attributed to the fact that though urban dwellers tend to adopt improved health practices, driven by their heightened awareness of the benefits of better health conditions, in contrast to their rural counterparts, they are more exposed to CO2 emissions produced by drivers and companies. Additionally, though, healthcare services are more readily available and concentrated in urban areas compared to rural regions, the weight of migration to urban areas brings about the shortage of medicines and less available health professionals for patients in West African States.

Given the importance of education in agenda 2063, better education helps to shape a healthy life. A 1% increase in the level of education leads to a 0.03-year increase in life expectancy and a 0.04% reduction in crude mortality. The low investment in education in West Africa continues to worsen life expectancy and reduce the crude mortality rate. Thus, the more people are educated, the more likely they will live an additional year because they pay much attention to unhealthy behaviors including smoking, drinking, and drug abuse. Additionally, educated persons have better access to health care (Goldberg and Smith 2007), and experience lower mortality rates (Mackenbach, 2006).

As Shilongo (2019), our results also indicate that a 1% increase in access to clean and drinkable water significantly increases life expectancy and decreases crude mortality rate which was found to be significant at a 1 percent level. specifically, a 1 percent increase in access to clean and drinkable water increases life expectancy by at least 0.06 years while reducing the crude mortality rate by at least 0.05% respectively. This result, according to Edeme (2017), can be explained by the fact that people who live in urban zones as compared to those in rural areas, have a better understanding of the benefits of being much healthier so they tend to adopt more healthy attitudes. Also, most of those who live in urban areas, have access to healthcare and social facilities. Therefore, they contribute to lower child mortality rates.

Poor environmental quality can have detrimental impacts on health by introducing pollution, which can result in chronic respiratory disease, cardiovascular disease, diabetes mellitus, and cancer. This research reveals that a 1% increase in greenhouse gas emissions is associated with a decrease in life expectancy by 4.41 years and an increase in infant mortality, under-five mortality, and crude mortality rate by 12.98%, 18.95%, and 1.56% respectively. It is widely recognized that greenhouse gas emissions contribute to climate change and give rise to a multitude of health problems (IPCC, 2018). The connection between CO2 emissions and human health was elucidated in a study by Mohammed et al. (2019), which analyzed data from the top ten emitting countries between 1991 and 2014. Rasoulinezhad et al. (2020) observed that CO2 variability explained the highest variation in mortality rates. This same finding was corroborated by Shobande (2019), who reported a significant impact of increased CO2 emissions on child mortality.

6.CONCLUSION

The study sets out to investigate the effect of health expenditures (public and private health expenditures) on population health status in the West African states captured by life expectancy, infant mortality rate, under-five mortality rate, and crude mortality. The study is based on Grossman's (1972) demand for health model. Through a feasible generalized least square method

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and data from 1996 to 2021 of the World Development Indicators, we found that the public and private health expenditure had a significant on life expectancy at birth and a negative effect on infant mortality rate, under-five mortality rate, and crude mortality. In addition, access to clean and drinkable water, Gross Domestic Product per capita, and urban population rate were found to contribute to improved health outcomes. In light of these findings, our conclusion underscores the necessity not only to increase health expenditure, aligning with the commitments outlined in the Abuja Declaration, to enhance the health status of the population, but also emphasizes the critical need for West African governments to implement national policies such as infant mortality rate, under-five mortality rate, and crude mortality. We also recommend that governments in West Africa fully implement universal healthcare coverage (UHC) to alleviate high poverty levels and health expenses for people to be able to afford their health expenses. Indeed, the implementation of the UHC will help protect individuals against ill health and cushion their income levels in the event of illness. Furthermore, the government should focus on enhancing social and environmental factors as a crucial factor for bolstering the labor force and productivity within the region. This, in turn, fosters improved behaviors and higher income levels, ultimately contributing to an enhanced quality of life and a reduction in mortality rates.

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