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Healthcare access and equity in Nigeria

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Abstract

This study examines government health finance, which requires patients to pay out-of-pocket even in the presence of a universal healthcare program, and how it affects Nigerians' life expectancy. Numerous investigations have indicated that socioeconomic factors impact healthcare results as well as the dispersion of medical facilities and resources throughout Nigeria. Government spending and gender life expectancy were used as indices to look at healthcare access and equity among socioeconomic determinants in Nigeria. In order to determine the impact of government health expenditure on life expectancy in relation to healthcare and equity in Nigeria, time series data was sourced from the Central Bank of Nigeria (CBN) statistical bulletin and World Population Prospects. A combination of descriptive statistics, Unit Root (ADF) test, Vector Regression (VAR), Autoregressive Distributed Lag (ARDL), Bounds test and residual diagnostics and stability test were used in the analyses. The study demonstrated a long-term, statistically significant association between the independent factors, such as male and female life expectancy, and the dependent variable, government health expenditure. Recurrent and capital health expenditures in Nigeria have been greatly impacted by the insufficient financial allocation to healthcare. It is important to remember that any health system's capital expenditures will continue to be greatly impacted by the inadequate funding. It is important to reform the healthcare finance system, ensure smart resource allocation, and shift the focus away from out-of-pocket healthcare expenses in order to improve the lives of both sexes and extend the existing life expectancy.

Keywords: Healthcare; Equity; Nigeria; Health financing; Life expectancy

1. Introduction

Health is a vital resource for every household and economy. This is due to the fact that better health boosts labor productivity, whereas poor health can lead to decreased labor productivity or higher healthcare costs, which can affect household welfare [1]. The human desire to maintain the best possible health is a common cultural trait. This may be explained by the fact that human health is essential to his existence as well as his capacity to fulfill his ambitions and goals on Earth. The utilization of health facilities is essential for a man to live and perform to the best of his abilities. For this reason, societies have created health service patterns overtime to take care of their citizens. However, there are still issues with the population's health, including how equally health facilities are dispersed throughout the social spectrum and how difficult it is for individuals to obtain or use them, particularly for the impoverished. As a result, the government must increase the availability of health facilities throughout the neighborhood and society at large.

As a result of poor nutrition, improper management of water and waste, and insufficient preventative healthcare; developing nations continue to bear a heavy burden of disease. In addition, access to healthcare is hampered by a lack of funding [2]. Nigeria, with a projected population of approximately 200 million [3] and a GDP of US$440.8 billion in 2021, is categorized by the World Bank as a low-income nation [4]. According to the 2010 World Bank evaluation, Nigeria's health system is grossly underfunded, operating at an extraordinary 9.44% per capita [5]. The distribution of the financial burden for healthcare is significantly impacted by the fact that a larger proportion of Nigerians, roughly

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71%; live in poverty [5]. Nigerian policy documents like the Abuja Declaration of 2010 underscore the goal of equity in health and healthcare, emphasizing that the poor and disadvantaged can have improved access to high-quality treatment. These policies are focused on guaranteeing access to healthcare and removing all obstacles, especially those related to finances, that prevent people from using it. Despite the fact, this suggests that there's a chance that different amount of household income are allocated to healthcare. It follows that the higher your income, the lesser you spend on healthcare and the caliber of care you receive, and the lower your income, the more you pay on both. The World Health Organization (WHO) regards quality, equity, and efficiency as the three major health system goals. Since 2015, an important objective of the global development agenda has been to achieve universal health coverage (UHC) [6]. UHC requires that everyone should have access to quality health services they require, without facing economic difficulties [7]. The connotations of this agenda are embodied in the following two aspects: equal access to national basic health services and economic risk protection against diseases [8]. Health financing aims to improve the health of the population, ensure the prevention of economic risk protection against diseases, and promote satisfaction of the health service needs of residents. The evaluation indicators of economic risk prevention in health financing include poverty caused by catastrophic health expenditure of households and personal cash expenditure.

In all the countries, there are huge differences in the health status of different socioeconomic groups regardless of their income level, whether low, middle, or high [9]. The lower a person's socioeconomic position, the higher the risk of poor health. There is therefore, strong evidence that socioeconomic characteristics like education, employment status, income level, gender, and ethnicity have a significant impact on one's health. These socioeconomic factors, often known as social determinants of health, are non-medical factors that have an impact on health outcomes and inequities [10]. Social determinants of health have been classified by the Centre for Disease Control and Prevention into five domains which are; economic stability, education access and quality, neighbourhood and built environment, healthcare access and quality, and social and community context [11].

Setting up a workable system of health funding is a tried-and-true way to accomplish UHC's goals. [12]. Health Financing is a workable system by which funds are generated, mobilized and utilized for healthcare [13, 14]. An effective healthcare financing system gives people sufficient financial safeguard against destitution brought on by the use of health services [12]. In Nigeria, the most common method of paying for healthcare has been out-of-pocket (OOP) spending, which is a regressive method. In Nigeria, out-of-pocket medical expenses make up roughly 69% of overall healthcare spending [15]. Consequently, poor households in Nigeria are either unable to access quality healthcare or face financial hardship from healthcare spending [13, 16]. Generally speaking, out-of-pocket payments (OOP) lead to people not using health services, showing up late to medical appointments, or using subpar hospitals. This is because only those who can afford it, not those who need it, may access high-quality healthcare, OOP spending leads to inequality. "This paper seeks to elucidate the disparities in access to healthcare services among different socio-economic groups in Nigeria, using government health expenditure and life expectancy of both sexes as indicators".

2. Methodology

This study employed time series data from 2000 to 2022. The secondary data were obtained from the Central Bank of Nigeria (CBN) statistical bulletin and World Population Prospects. The association between government health spending and the life expectancy of men and women was the major research in this work. Fundamental presumptions include the correlation between government health spending and life expectancy as well as the determination of which gender has longer lifespans.

To analyze the unit root data series and stationarity, the Johansen co-integration method and the Augmented Dickey-Fuller (ADF) Test were used. The short-term variations were evaluated using the vector error correction mechanism (VECM), and the cointegration of the series was evaluated using the bound cointegration test. The study employed the autoregressive distributed lag (ARDL) technique to investigate the distinct effects of government health expenditure on health outcomes over the short and long term. Male and female sex life expectancy was used to measure the health consequences. E-views 10.0 was the econometric program utilized to estimate the econometric model.

The government expenditure on health and life expectancy of both gender models were expressed as:

$$GHEXP = f(MLE, FLE) \quad (1)$$

The Equation 1 now is transformed into a stochastic form as follows:

$$GHEXP = \alpha + \beta_1 MLE + \beta_2 FLE + \mu \quad (2)$$

Where GHEXP denotes Government Health Expenditure, MLE denotes Male Life Expectancy and FLE denotes Female Life Expectancy and of course constant and error term included.

3. Results

3.1. Empirical Analysis

The descriptive analyses, as reflected by the standard deviation, mean, kurtosis, and skewness, is presented in Table 1. The average government health expenditure is 4.35 within the ranges of 0.38-10.49 and skewness and kurtosis of 0.52 and 1.99 respectively. This implies that the average percentage of government spending on health is 4.35. Life expectancy for male has a mean of 50 years with minimum and maximum of 46 and 53 respectively and a standard deviation of 2.2. This implies that male in Nigeria is expected to live on average 50 years. Life expectancy for female has a mean of 51 years with minimum and maximum of 48 and 54 respectively and a standard deviation of 1.6. This implies that female in Nigeria is expected to live on average 51 years. Overall, most of the variables were positively skewed with a high value of kurtosis.

Table 1 Descriptive Analysis

	GHEXP	**MLE**	**FLE**
Mean	4.347391	50.20087	51.38000
Median	4.460000	50.92000	51.79000
Maximum	10.49000	53.30000	53.97000
Minimum	0.380000	46.09000	48.33000
Std. Dev.	3.311490	2.156407	1.560667
Skewness	0.521689	-0.502974	-0.387764
Kurtosis	1.994431	2.003489	2.204412
Jarque-Bera	2.012313	1.921426	1.182970
Probability	0.365621	0.382620	0.553505
Sum	99.99000	1154.620	1181.740
Sum Sq. Dev.	241.2512	102.3020	53.58500
Observations	23	23	23

Source: Author's Computation 2023

3.2. Augmented Dickey Fuller- Unit Root Test and Johansen Cointegration Test

Table 2 Augmented Dickey Fuller (ADF) Unit Root Test

Series	**H0: Unit Root Test I(0)**			**H0: Unit Root Test I(1)**			
	Level			**1st Difference**			
	Test Statistic	**Critical Value**	**P-Value**	**Test Statistic**	**Critical Value**	**P-Value**	**Order of Integration**
GHEXP	-0.248412	-3.004861	0.9181	-5.074234	-3.012363	0.0006	I(1)
MLE	-3.020686	-3.020686	0.0345	-	-	-	I(0)
FLE	-2.206642	-3.012363	0.2098	-5.148579	-3.012363	0.0005	I(1)

Source: E-views 10

Johansen cointegration analysis and the ADF unit root tests indicated in Table 2 were carried out. Female life expectancy and government health spending are integrated at order 1, but they became stationary at first differencing, or level 1, or first difference. In contrast, the life expectancy for men remains constant at order 0. After the unit root result test, the

research utilized the results of the cointegration test indicating that, at the five percent significance level, the maximum eigen values and the trace tests are found to be bigger than their critical values. Additionally, the co-integration equations' p-values are less than 5%, which indicates that the variables will expand proportionately and have a shared stochastic trend. In other words, they move together in the long run meaning that they have long run association.

3.3. Vector Autoregressive and Lag Length

Three columns correspond to the three equations in the VAR model. There are three significant coefficients beside the intercept. The first and second lag of GHEXP is significant in the GHEXP equation. The first and second lag of male life expectancy is significant in the MLE equation and the first and second lag of female life expectancy is significant in the FLE equation. This means that the estimated model explains about 91.6 percent of the variations in Government health expenditure. The F-statistic result also supports this conclusion with 25.39 explained model. The VAR model depends on the correct model specification. Hence, the optimal lags required in the co-integration test were chosen using the most common traditional information criteria being the Akaike Information Criteria (AIC), Schwarz Criterion (SC), Hannan and Quinn's (HQ) and the likelihood ratio (LR).

Table 3 Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-72.682	NA	0.195286	6.880151	7.028929	6.915198
1	-10.688	101.4444*	0.001598*	2.062530*	2.657645*	2.202721*

Source: E-views 10

3.4. Bounds Test and Error Correction Model

Bounds test is used to investigate the existence of long-run cointegration among the variables as presented in Table 4. The results of the bounds test show that at the Null hypothesis of no level relationship, there is no cointegration looking at the F-value at 13.98 which is above the 5% significance level of lower and upper bound test. Therefore, it means we have to reject the null hypothesis of no cointegration and that there were long-run relationships between the dependent variable GHEXP and the independent variable MLE and FLE. For the t-bounds test, the absolute t-value of 4.8 is higher than the 5% significance level of both the lower bounds and upper bounds test, which means we reject the null hypothesis. Hence, there is no long-run relationships with the model. The error correction model passed the three-significance test as the p-value is less than 5% significance level. At 20.57%, it shows that there is low speed of adjustment from the short-run to the long-run if there is any disequilibrium in the system. With the R-squared at 86%, it shows that the model is a Good-Fit. However, the overall F-statistic value of 7.69 is greater than the probability value, which means it is statistically significant. However, when you look at all the variables and lag variables, it is statistically significant as all the variables both the dependent and independent variables are lower than the 5% significant level.

Table 4 Cointegration Using Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship			T-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)	Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	13.98742	10%	4.19	5.06	t-statistic	-4.812852	10%	-3.13	-3.63
k	2	5%	4.87	5.85			5%	-3.41	-3.95
		2.5%	5.79	6.59			2.5%	-3.65	-4.2
		1%	6.34	7.52			1%	-3.96	-4.53

Source: E-views 10

3.5. Autoregressive Distributed Lag (ARDL) Bounds Test

The Autoregressive distributed lag bounds test model shows that the F-value of 5.62 is above the 5% significance level of both the lower and upper bound test. Therefore, it means we have to reject the null hypothesis of no cointegration and that there are long-run relationships between the dependent variable GHEXP and the independent variable MLE

and FLE. For the t-bounds test, the absolute t-value of -0.53 is higher than the 5% significance level of both the lower bounds and upper bounds test, which means we reject the null hypothesis. MLE and FLE probability test are not statistically significant as it is greater than 5% level of significance. But the coefficient of the two variables is both positive.

3.6. Residual Diagnostic and Stability Test

The residual diagnostic test in Table 5 is a test on Breusch-Godfrey Serial Correlation LM test, Normality Test, and Heteroskedasticity ARCH Test. These tests all have P-values above the 5% significance level. This indicates that there is no substantial evidence of serial correlation, heteroskedasticity, or non-normality in our model and its residuals. The absence of serial correlation suggests no systematic pattern or correlation over time in the residuals, supporting the reliability of the model's estimates. The lack of evidence for heteroskedasticity indicates constant variance of residuals across different levels of independent variables, strengthening the validity and interpretability of the model's coefficients. The non-rejection of the normality test suggests that the residuals follow a normal distribution, a crucial assumption for OLS regression, enhancing the reliability of the model's predictions. The stability test in table 6, present the Ramsey Reset Test which established that there is a linear relationship between the dependent and independent variables. The F-statistic and t-statistic from both values exceed the 5% level of significance. The outcomes of the Ramsey Reset Test affirm the validity of our model's structure, suggesting that the linear regression framework effectively captures the relationships between the variables under consideration.

Table 5 Residual Test

Residual Diagnostic tests	**P-value**
Breusch-Godfrey Serial Correlation LM Test	0.8653
Jarque-Bera	0.4100
Heteroskedasticity Test: ARCH	0.5678

Source: E-views 10

Table 6 Ramsey Reset Test

	Value	**df**	**Probability**
t-statistic	2.024093	7	0.0826
F-statistic	4.096954	(1, 7)	0.0826

Source: E-views 10

3.7. Cusum and Cusum of Square Test

The figure 1 and 2 below are the Cusum and Cusum of square tests which showing the blue lines lying between the two critical boundaries represented by the red lines. This observation indicates that the model coefficient is stable over time. The stability of the model is a positive indication of its reliability and robustness for forecasting and analysis, as it demonstrates consistent relationships between the dependent and independent variables throughout the observed time span.

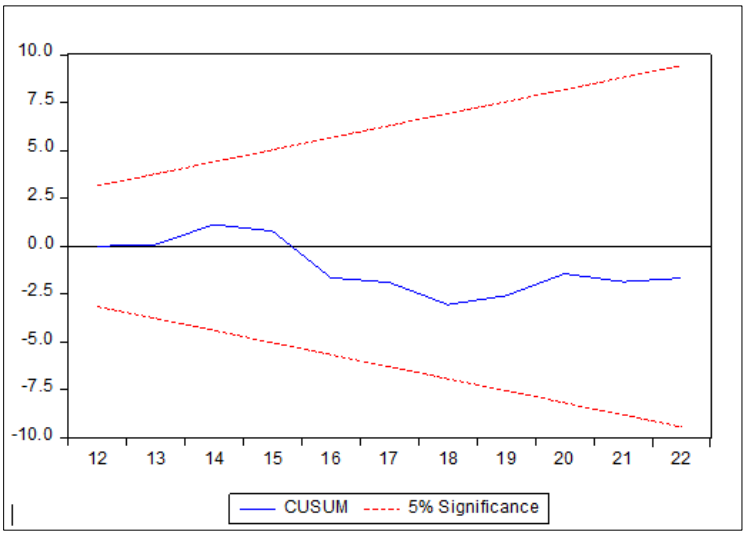

Figure 1 Cusum

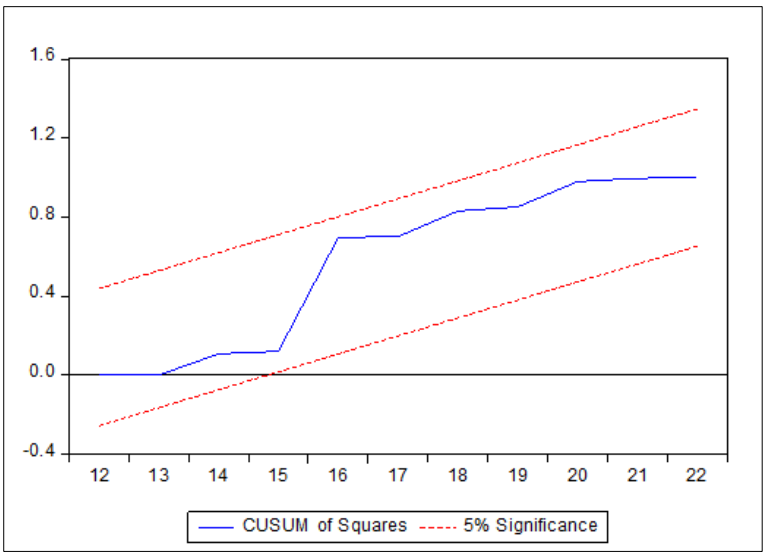

Figure 2 Cusum of Squares

4. Discussion

This study showed that while government expenditures had a negative impact on male life expectancy, they had a good impact on female life expectancy. This result is consistent with the World Health Organization's (WHO) report [7], which states that government health spending has a greater positive influence on mothers' and children's well-being than it does on fathers in terms of providing free medical care. Thus, the mother and women in general live longer, thanks to this government act.

5. Conclusion

According to our research, having access to healthcare can enhance the lives of people of all genders and increase their present life expectancy. The government must take more action to ensure that healthcare is equitable for all people, regardless of their gender, age, ethnicity, tribe, religion, class of status, educational background, or political affiliation. As long as you can afford the services provided, there should be no obstacles at all. The providers should also ensure that everyone is treated equally and fairly, regardless of background or status, since discrimination frequently results

in poor patronage. Several times, governments have pledged to enhance the financing of the health budget, such as the Abuja Declaration of 2010 which mandated that at least 10% of the country's GDP be allocated to health. However, little progress has been made, as the government's health expenditure to budget ratio has consistently fallen below 7% in recent years.

Recommendations

To close the disparity in health coverage, the government must increase spending. Although we are aware that the Federal Ministry of Health, working with foreign donors, has implemented a number of initiatives to increase equity and access to healthcare, the implementation of these initiatives is being hampered by a lack of funding. This study hereby proposes the following recommendations:

- The government should figure out a way to offer insurance or expand the coverage of the current policy to include healthcare practitioners and those living in remote areas of Nigeria.
- The government should decide how to ensure that the rules are followed to the later by keeping an eye on how the money is being distributed and getting rid of middlemen, bureaucracy, and corruption.
- The government should also reduce the distance to healthcare services to two kilometers in each local community. By doing this, access rates will rise and the number of persons seeking unapproved healthcare services or self-help will decline.
- The government should guarantee that treatments are provided without delay to registered health insurance subscribers and that their funds cover all medications and services, even if it requires them to pay a little bit more.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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