IMPACT OF GOVERNMENT HEALTH EXPENDITURE ON HEALTH OUTCOMES IN NIGERIA (1988-2021)

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Abstract

This study examined the impact of government health expenditure on health outcomes in Nigeria. Time series secondary data were sourced from the Central Bank of Nigeria and World Development Indicators for the period 1988-2021. The dependent variable was Malaria Incidence Rate proxied to health outcomes. While the independent variables were Government Health Expenditure, Government Education Expenditure and Out of Pocket Expenditure. The study adopted the Autoregressive Distributed Lagged Model (ARDL) to estimate the model for the study. The bound cointegration test showed the existence of a long-run relationship between the malaria incidence rate and the explanatory variables. Findings from the Error Correction Model showed that government spending on health has an insignificant negative impact on malarial incidence. However, government education spending has a significant negative impact on malaria incidence. The long-run model revealed a significant positive relationship between out-of-pocket spending by households and the malaria incidence rate. Based on the findings, the study recommends that the government should improve the availability and accessibility of healthcare facilities. The government should foster collaboration between the health and education sectors. Health education should be integrated into schools training teachers and students on malaria prevention.

Keywords: Government education expenditure, Government health expenditure, Malaria incidence, Out-of-pocket expenditure.

Jel Classification Code: H51

1. INTRODUCTION

The World Health Organization defined health in its 1948 constitution as a state of complete physical, mental, and social well-being, extending beyond the absence of disease or infirmity. It is a fundamental right for all individuals, regardless of race, religion, political beliefs, or economic and social status (International Health Conference, 2002). Health outcomes refer to changes in health status, including mortality and morbidity, resulting from healthcare provision (Pallipedia, 2009). These changes can be attributed to planned interventions or a series of interventions, irrespective of their intended impact on health status (WHO, 1998).

Nigeria's health expenditure falls below global standards, but a comparison with neighbouring countries suggests that more efficient and equitable investment of existing resources, such as redirecting healthcare financing away from out-of-pocket payments and focusing on preventive and primary care interventions, could yield significant improvements (Angell et al., 2022). Out-of-pocket healthcare payments contribute to pushing many individuals into poverty, and the government's allocation for healthcare is insufficient. To enhance the Nigerian healthcare system, policymakers and political actors need to reduce reliance on out-of-pocket spending and increase public health expenditure (Aregbeshola & Khan, 2021).

While the amount allocated to the Nigerian health sector has increased over the years, it remains low compared to many other African countries. In the 2023 budget, over a trillion Naira was allocated to the health sector out of a total budget of N20.5 trillion. (Adebowale-tambe, 2022). This represents an increase from N547 billion and N826.9 billion allocated in 2021 and 2022, respectively. An analysis by PACFaH@scale, a coalition anchored under the Development Research and Projects Centre, revealed a 323.68 per cent increase in health sector expenditure from 2015 to 2023, indicating progress. However, the proposed expenditure for the health sector in 2023 accounted for only 5.75% of the total budget, falling far short of the 15% requirement set by the Abuja Declaration. Unlike Nigeria, countries like Rwanda and South Africa have met this requirement, which Nigeria has not achieved in the past 21 years (Adebowale-tambe, 2022).

Nigeria's inability to meet the minimum standard for health expenditure has led to poor health outcomes compared to other African countries that have experienced improvement. Although Nigeria witnessed some improvement in population health measures between 1998 and 2019, it still lags in several areas. For instance, Nigeria ranks sixth in West Africa for age-standardized mortality rate, seventh for healthy life expectancy (HALE), tenth for Years of Life Lost (YLLs), twelfth for health system coverage, and fourteenth for Years Lived with Disability (YLDs) in 2019. The country also has the fourth-highest under-five mortality rate for both males and females (Angell et al., 2022).

It is worrisome that government health expenditure in Nigeria falls significantly below the standards. This has resulted in increased out-of-pocket spending by households, leading to low-quality healthcare services and poor health outcomes, such as high infant and maternal mortality rates, high neonatal rates, high malaria infections, and other health shocks. This study aims to investigate the impact of government health expenditure on health outcomes, with a specific focus on its influence on malaria mortality.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Health expenditure

Health expenditure refers to the financial resources allocated to the provision of healthcare goods and services within a specified period. It encompasses both public and private spending on healthcare including out-of-pocket payments, government funding, health insurance contributions and donations (WHO, 2017). It is the total amount of money spent on goods and services, including both public and private funding sources. It encompasses various components such as healthcare provider payments, medical equipment and supplies, pharmaceuticals, hospital services, preventive programs and administrative costs.

2.1.2 Health Outcomes

Health outcomes are measurable changes in the health status of individuals or populations as a result of healthcare interventions policies, or environmental factors. They reflect the overall impact of health on well-being and include various health indicators such as morbidity rates, mortality rates, life expectancy, disability prevalence and quality of life (WHO, 2021). It is the health consequences brought about by the treatment of a health condition or as a result of an interaction with the system. It is a multidimensional concept that can be studied on multiple levels (Lee & Leung, 2014). The New South Wales Health Department in Australia defined it as a change in the health of an individual, group of people or population which is attributable to an intervention or series of interventions highlighting changes in health status as the focus of analysis (Frommer et al., 1992).

2.2 Theoretical Framework

The Grossman model was adopted in this work. The Grossman model was developed by Michael Grossman in 1972. It is an economic framework that explains the determinants of health and how investments in healthcare affect health outcomes. According to this model, individuals make decisions regarding their health based on a trade-off between healthcare expenditures and other goods or activities.

In the Grossman model, health is treated as a form of capital that individuals invest in through healthcare expenditures. These expenditures for cabs include preventive measures, medical treatments, and health-promoting behaviour.

In the Grossman model, H=f (E, X, Z)

Where:

H= represents health capital or health status

E= health expenditure or investment

X= other personal characteristics or behaviours that affect health (e.g., education)

Z= represents external factors and social determinants of health

The model argues that investment in healthcare improves an individual's health capital which in turn leads to better health outcomes. The model prefers education, and income as a preference for health outcomes. For example, higher education levels can lead to better health knowledge and health behaviours. Higher-income can provide individuals with greater access to healthcare services.

2.3 Empirical Review

Previous studies have been able to investigate the impact of health expenditure on health outcomes in Nigeria. For instance, Oladosu et al. (2022) did a cross-country analysis by investigating the impact of public health expenditure on health outcomes in Nigeria and Ghana. Health outcomes were captured by infant mortality, maternal mortality, malaria mortality, and HIV/AIDS mortality. Using the linear regression analysis, the study found a low public health expenditure in both countries. Also, an insignificant negative impact of health expenditure was found in Ghana while a significant positive impact was found in Nigeria.

Using annual time series data from 1986 to 2020, Musa (2022) investigated the impact of health expenditure on health status in Nigeria. The study employed the co-integration and error correction model for the analysis and the findings revealed that healthcare expenditure has a negative impact on infant mortality rate in Nigeria. The level of education also had a negative and insignificant relationship with the infant mortality rate in Nigeria.

Nwanosike et al. (2022) examined the impact of public healthcare spending on health outcomes in Nigeria using life expectancy and infant mortality rate as proxies for health outcomes. They employed the ordinary least squares method and they found private health expenditure as the major factor affecting health outcomes in Nigeria. Findings also revealed a negative relationship between public expenditure and both health outcomes of infant mortality and life expectancy in Nigeria due to constrained healthcare financing.

In a bid to examine the relationship between government health expenditure and health outcomes in Nigeria, Umaru et al. (2022) used the Vector autoregressive model on time series data from 1981 to 2020. Their findings revealed that Government health expenditure has a negative relationship with infant mortality in Nigeria.

Gbagidi et al. (2021) used the Vector Autoregressive Model (VAR) to examine the nexus between public health expenditure, health outcomes, and economic growth in Nigeria from 1987 to 2018. The impulse response function of the VAR revealed that all the variables responded to their shocks as well as shocks from other variables.

Using Under 5 mortality per 1000 birth and Life expectancy as a proxy for health outcomes, Orji et al, (2021) examined the impact of public health expenditure on health outcomes in Nigeria from 1985–2019. Findings from the classical regression analysis showed that health expenditure by the government has a significant impact on the under-5 mortality rate and life expectancy. Immunization against measles also has a significant impact on the under-5 mortality rate.

Ebhotemhen and Hezekiah (2021) used the ARDL model and Error Correction Mechanism to examine the impact of public health expenditure on Nigeria's health sector performance from 1981 to 2020. Their findings revealed a significant long-run equilibrium relationship between life expectancy and the explanatory variables in the study.

In a bid to investigate the impact of health expenditure on the child mortality rate in Nigeria from 1980 to 2015, Hamzat et al. (2019) utilized used infant mortality rate to proxy health outcomes. Employing the Autoregressive Distributed Lag model (ARDL), their findings revealed a significant negative relationship between health expenditure variables and infant mortality rate in Nigeria.

In a bid to examine the relationship between health expenditure, health outcomes and economic growth in Nigeria, Ogunjimi and Adebayo (2019) used time series data from 1981 to 2017. They employed the Toda-Yamamoto approach, their findings revealed a unidirectional causality running from health expenditure to infant mortality.

Udeorah et al. (2018) Used descriptive statistics and a generalized method of moment (GMM) to examine the impact of healthcare expenditure on economic growth in Nigeria. The study revealed that healthcare expenditure is not statistically significant on economic growth. However, government education expenditure has a significant positive impact on economic growth.

Edeme et al. (2017) used Life expectancy and infant mortality rates as proxies to examine the effect of public health expenditure on health outcomes in Nigeria from 1981 to 2014. Employing the descriptive statistics and Ordinary least square regression method, the findings revealed a long-run equilibrium relationship between public health expenditure and health outcomes in Nigeria.

Matthew, et al. (2015) used life expectancy as a proxy to measure health outcomes in their study on the impact of public health spending on health outcomes in Nigeria from 1979 to 2012. Using the Johansen Co-integration and the Vector Error Correction Model (VECM). The study found a significant relationship between public health spending and health outcomes in Nigeria.

Ogungbenle et al. (2013) used the vector autoregressive (VAR) model to investigate the relationship between life expectancy, public health spending and economic growth in Nigeria. They found bidirectional causality between life expectancy and public health spending in Nigeria.

Yaqub et al. (2012) examined how governance indicators captured by the corruption perception index affect the effectiveness of public health expenditure in improving health outcomes in Nigeria. Using the ordinary least squares and the two-stage least squares approaches, their findings revealed a significant negative effect of public health expenditure on infant mortality and under-5 mortality when the governance indicators are explanatory variables.

2.4 Gaps in Literature

Previous studies have been able to analyse the impact of health expenditure on health outcomes in Nigeria, however, the following gaps were discovered by this study which is the main rationale behind this study. Firstly, most of the works reviewed used either infant mortality, under 5 mortality or life expectancy or both as a proxy for health outcomes ignoring the incidence of malaria which is very much prevalent in the Nigerian economy. Instances are authors such as Orji, et al. (2021), Nwanosike et al. (2022), Edeme et al. (2017),Ogunjimi and Adebayo (2019), Musa (2022), Hamzat et al. (2019) and Matthew et al. (2015). Only Oladosu et al. (2022) captured malaria mortality in their studies. This study will cover this gap by using the malaria incidence ratio as a proxy for health outcomes. Also, most of the studies focused on government expenditure on health without looking at the effect of other government spending like government education spending which is a strong controlled variable in explaining Malaria prevention and awareness in Nigeria. This study will split government expenditure into health and education and look at their individual effects on health outcomes in Nigeria. Also, household out-of-pocket spending was not captured in previous studies and one cannot be discussing the impact of government spending on health outcomes without looking at how this has caused an increase in out–of–pocket spending, especially in a country like Nigeria where the percentage of out-of-pocket spending is high. This study will therefore capture pocket health expenditure as one of the controlled variables.

3.0 METHODOLOGY

3.1 Data Source and Description

The study made use of time series secondary data to analyze the impact of government health expenditure on health outcomes in Nigeria. Data on Malaria incidence rate and Out of pocket Expenditure were sourced from World Development Indicators (WDI) while Government health expenditure, Government expenditure on education were sourced from the Central Bank of Nigeria Statistical Bulletin, 2021.

Table 3.1 Variable Description

Variable	Description	Source
Malaria incidence rate	This is defined as the number of cases of malaria per 1000 people at risk each year. It is used as a proxy for health outcome	World Development Indicator
Government health expenditure	This is the total amount of money spent by the government on the health sector. It is measured as a percentage of total government spending.	Central Bank of Nigeria Statistical Bulletin, 2021
Government education expenditure	Government expenditure on education is the proportion of total government spending spent on education. It is also measured in percentage.	Central Bank of Nigeria Statistical Bulletin, 2021
Out-of-Pocket Spending	This is the proportion of total health expenditure spent by households on medical expenses. It is measured as a percentage of total health expenditure.	World Development Indicator

3.2 Model Specification

This study adapted the work of Udeorah et al. (2018) where government health expenditure and government education expenditure were used as explanatory variables in the process of examining the effect of government health spending on economic growth in Nigeria. Also in line with the Grossman theory, the model for this study will be specified as follows:

Functional Form of the Model

$$\boldsymbol{MIR = f(GHE, GEE, OOPEX)}$$

Where: MIR=Malaria Incidence Rate used as a proxy for health outcomes

GHE= Government Health Expenditure, GEE= Government Education Expenditure, OOPEX= Out of Pocket Expenditure on Health.

The ARDL Bound Cointegration model is formulated as follows:

$$\Delta MIR_t = \omega + \gamma T + \alpha MIR_{t-1} + \alpha_2 GHE_{t-1} + \alpha_3 GEE_{t-i} + \alpha_4 OOPEX_{t-I} + \sum_{i=1}^{m} \varphi_i \Delta MIR_{t-i} + \sum_{i=0}^{n} \beta_{1\,i} \Delta GHE_{t-i} + \sum_{i=0}^{p} \beta_{2\,i} \Delta GEE_{t-i} + \sum_{i=0}^{q} \beta_{3\,i} \Delta OOPEX_{t-i} + \in_t \quad (1)$$

The Error correction model is formulated as follows:

$$\Delta MIR_t = \omega + \sum_{i=1}^{m} \varphi_i \Delta MIR_{t-i} + \sum_{i=0}^{n} \beta_{1\,i} \Delta GHE_{t-i} + \sum_{i=0}^{p} \beta_{2\,i} \Delta GEE_{t-i} + \sum_{i=0}^{q} \beta_{3\,i} \Delta OOPEX_{t-i} + \partial ECT_{t-i} + \in_t \quad (2)$$

The long run form is estimated as follows:

$$MIRt = \pi + \alpha 1\, GHEt - 1 + \alpha 2\, GEEt - 1 + \alpha 3\, OOPEXt - 1 + \in t \quad (3)$$

Where ω= intercept of the short-run model, π = intercept of the long-run model, φ_i = coefficient of the lagged values of the dependent variable, $\alpha_1 - - - \alpha_3$ = long-run coefficients of the ARDL model. $\beta_{1\,i} \ldots\ldots \beta_{3\,i}$= short-run coefficients of the ARDL model, ECT= Error correction term, ∂= Coeficients of the error correction termΔ= Difference operator.

3.3 Method of Data Analysis

To examine the impact of government health expenditure on health outcomes in Nigeria, Descriptive statistics were used to analyse the nature of the data. The unit root test was conducted using the Augmented Dickey-Fuller (ADF) Test and Philips-Perron test. ARDL bound test was carried out to determine if there is a long-run relationship among the variables and also to capture the long-run estimates. The Error Correction Model was estimated for the short-run coefficients. Several post-estimation tests were carried out to check for the robustness of the model.

3.4 Pre-estimation Methods

3.4.1 Unit Root Test

Routinely, the time-series properties of macroeconomic variables need to be ascertained when carrying out time-series analysis to guard against obtaining spurious results. Ogunjimi and Adebayo (2019). The appropriate test for checking these time series properties is the unit root test. It tests the null hypothesis of the presence of unit root as against the alternative hypothesis of the absence of unit root. The decision rule is to reject the null hypothesis when the test statistic is greater than the critical values in absolute terms otherwise, we will accept the null hypothesis.

3.4.2 ARDL Bound Cointegration Test

When the unit root test shows a mixed order of integration of variables. The Engle-Granger and Johansen cointegration test cannot be used. The appropriate method to adopt is the ARDL bound test as developed by Pesaran et al. (2001). The decision rule is

to reject the null hypothesis of no levels relationship in the long run if the computed F-statistic is greater than the upper bound value and accept the null hypothesis if the computed F- statistic is less than the lower bound value. However, the test becomes inconclusive when the computed F-statistic lies between the lower and upper bound.

4.0 RESULTS AND DISCUSSION OF FINDINGS

The closeness of the mean and median as well as small values of the standard deviation shows that the data are evenly spread around the average value.

Table 1. Descriptive Statistics

	MIR	GHE	GEE	OOPEX
Mean	404.1214	3.9091	8.0635	65.5298
Median	417.3769	4.215	8.18	68.2147
Maximum	510.3455	6.99	12.56	77.2695
Minimum	275.003	0.28	0.55	51.3363
Std. Dev.	77.51289	1.5969	2.3213	8.5733
Skewness	-0.430223	-0.1084	-0.8354	-0.2266
Kurtosis	1.85837	2.3785	4.9756	1.4665
Jarque-bera	2.895222	0.6138	9.4835	3.6223
Probability	0.235131	0.7357	0.0087	0.1635
Sum	13740.13	132.91	274.16	2228.016
Sum Sq. Dev.	198272.2	84.1565	177.814	2425.57
Observations	34	34	34	34

Source: Author's compilation, 2023

The p-value of the Jarque-Bera shows that all the variables are normally distributed except GEE whose value is less than 0.05.

Table 2. Correlation matrix

	MIR	GHE	GEE	OOPEX
MIR	1	-0.7785	-0.2159	-0.8426
GHE	-0.7785	1	0.5112	0.7909

GEE	-0.2159	0.5112	1	0.1641
OOPEX	-0.8426	0.7909	0.1641	1

Source: Author's compilation, 2023

The result above shows a strong negative correlation between Government Health Expenditure (GHE) and Malaria Incidence Ratio (MIR). It also shows a strong positive correlation between Out of pocket expenditure on health (OOPEX) and Government Health Expenditure. It also shows a strong negative correlation between MIR and OOPEX.

4.1 Pre-Estimation Test

Table 3. Unit Root Test

	ADF			**Philips- Perron**		
Variables	**Levels**	**1st Difference**	**I(d)**	**Levels**	**1st Difference**	**I(d)**
MIR	-1.4586	-3.9706a**	I(1)	-2.1223	-3.2926a**	I(1)
GEE	-3.9202b**	-	I(0)	-3.6898b**	-	I(0)
GHE	-4.4279b*	-	I(0)	-4.4278b*	-	I(0)
OOPEX	-2.2333	-5.7098b**	I(1)	-2.3338	-7.9548b*	I(1)

Where a represents critical value with intercept, b represents critical values with trend and intercept, * represents significance at 1%, ** represents significance at 5%

Source: Author's compilation, 2023

The Augmented Dickey-Fuller Statistic shows that MIR and OOPEX are non-stationary at levels but are stationary at first difference. It means they are I(1) variables. On the other hand, GEE and GHE are both stationary at levels with an I (0) order of integration. The Philips-Perron statistic also confirmed the findings from the augmented dickey-fuller test. Since both the ADF statistic ad Philips-Perron confirmed a mixed order of integration, it is evidence of the possibility of a long-run equilibrium relationship. We may therefore proceed to perform the ARDL bound test as propounded by Pesaran et al. (2001).

Table 4. Optimal Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-356.6179	NA	324415.6	24.0412	24.2280	24.1010
1	-266.4077	150.3502*	2332.964	19.0939	20.02710*	19.3927
2	-248.89	24.5248	2246.915	18.9927	20.6741	19.5306
3	-226.6574	25.1969	1756.243*	18.5772*	21.0059	19.3541*
4	-215.0055	10.0984	3371.057	18.8670	22.0430	19.8831

Where * indicates lag order selected by the criterion, LR = sequential modified LR test statistic (each test at 5% level), FPE = Final prediction error, AIC = Akaike information criterion, SC = Schwarz information criterion and HQ = Hannan-Quinn information criterion

Source: Author's compilation, 2023

Three of the information criteria above i.e. Akaike, Schwarz and Hannan-Quinn all suggested a lag length of 3. This will be used for our estimations.

Table 5. ARDL Bound Cointegration Test

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.665226	10%	3.47	4.45
k	3	5%	4.01	5.07
		2.50%	4.52	5.62
Actual Sample Size	31	1%	5.17	6.36

Source: Author's compilation, 2023

From the ARDL bound test result above, we are rejecting the null hypothesis of no levels relationship since the computed F-statistics of 6.67 is greater than the upper bound critical value at all levels of significance. We can therefore conclude that a long-run relationship exists between the Malaria incidence ratio and the various explanatory variables i.e. GHE, GEE and OOPEX.

4.2. Model Estimation

The parsimonious error correction model above shows that in the short run, the current value of government health expenditure has a negative impact on the malaria incidence ratio as indicated by its negative coefficient. However, the impact is not statistically significant as shown by the p-value.

Conversely, one and two-period lags in government education expenditure have a significant negative impact on the Malaria Incidence ratio. For instance, a one per cent increase in one and two-period lags of GEE will on average leads to a 0.97% and 1.07% decrease in malaria incidence ratio.

Table 6. Parsimonious Error Correction Estimates

Dependent Variable: MIR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MIR(-1))	0.7862	0.1035	7.5995	0.0000
D(GHE)	-0.6428	0.8711	-0.7380	0.4691
D(GEE)	-0.3259	0.4208	-0.7745	0.4477
D(GEE(-1))	-0.9785	4.09E-01	-2.3934	0.0266
D(GEE(-2))	-1.0172	3.73E-01	-2.7308	0.0129
ECT(-1)	-0.5152	5.69E-02	-9.0509	0.0000

Source: Author's compilation, 2023

The coefficient of the error correction term of -0.515176 indicates that about 52% of the deviations in MIR caused by shocks in the explanatory variables will be corrected in the long run. This is evidence of a high speed of adjustment from the short-run disequilibrium to the long-run equilibrium. The negative sign of the coefficient of ECT shows that it conforms to economic theory and the p-value of 0.0000 shows that it is statistically significant at 1%.

Table 7. Long Run Estimates

Dependent variable: MIR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GHE	-10.9126	7.0906	-1.5390	0.1395
GEE	-1.1203	2.9834	-0.3755	0.7112
OOPEX	4.7415	1.0627	4.4619	0.0002

Source: Author's compilation, 2023

From the long-run model, both government health expenditure and government education expenditure have a negative impact on the malaria incidence ratio. However, their impact is not statistically significant as revealed by their probability values of 0.13 and 0.7112 respectively. However, OOPEX has a significant long-run positive impact on the malaria incidence ratio. For instance, a one-unit increase in OOPEX will on average bring about a 4.741538 unit increase in MIR.

4.3 Post Estimation test

To check for the robustness of the model, various estimation tests were conducted and the summary of the results is presented below

Table 7. Error correction model post-estimation test results

R^2	0.9969
Adjusted R^2	0.9953
D.W Statistic	1.7781
Prob. (f-statistic)	0.0000
Prob. (Jaque-Bera)	0.3048
Breuch-Godfrey (LM serial correlation)	0.6500
Breuch-Pagan Godfrey (Heteroscedasticity)	0.9351

Source: Author's compilation, 2023

Stability Test

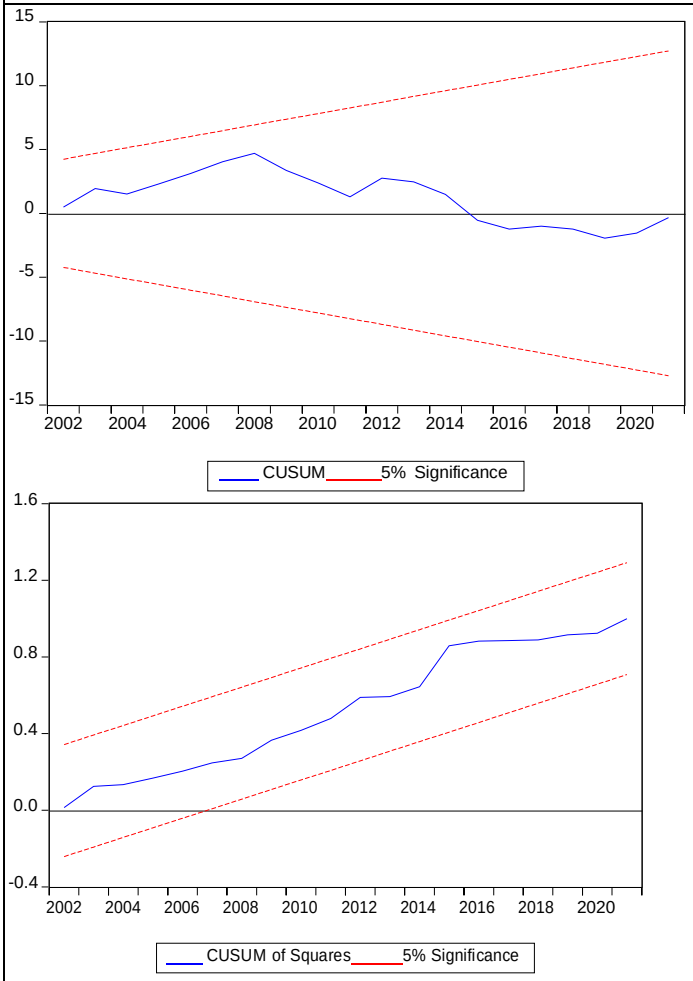

Fig 4.1 Cusum and Cusum of Squares Test

Source: Author's compilation, 2023

From the post-estimation test result above, the R^2 of 0.996874 means about 99.7% of the variation in the malaria incidence ratio is caused by the changes in the government health expenditure, government expenditure on education and out-of-pocket spending. The Durbin-Watson statistic of 1.77 is a sign of no autocorrelation since it is approximately close to two. A P-value of the Jarque-Bera of 0.3048 shows that the model is normally distributed. The Breuch-Godfrey value of 0.65 shows the absence of serial correlation at a 5% level of significance. The Breuch-Pagan Godfrey value of 0.9351 shows that the model is free from heteroscedasticity at a 5% level of significance. Lastly, the graph of CUSUM and CUSUM square above shows that the model is stable since the lines lie within the five per cent critical bound. It means the model does not suffer from any structural break throughout the study.

4.1 Discussion of Findings

This study examined the impact of government health expenditure on health outcomes in Nigeria. The malaria incidence rate was used to capture health outcomes. Some of the key findings are discussed as follows. Firstly, both the short-run and long-run models showed an insignificant negative impact of government health expenditure on the Malaria prevalence ratio in Nigeria. The negative relationship is in line with the findings of previous studies about other health outcomes e.g. as seen in the studies done by Umaru et al., 2022), Yaqub et al., (2012), Orji et al., (2021), Nwanosike et al, (2022), Matthew et al., (2015) and Hamzat et al., (2019). However, the studies mentioned found a significant impact of health expenditure on another health outcome which is in contrast to the result of this study. The insignificant negative relationship is however in line with the findings by Oladosu et al., (2022) in Ghana. The insignificant negative relationship implies that while government health spending is significant on other health outcomes, its impact on malaria incidence may not be significant. Policymakers need to recognize that addressing malaria requires a comprehensive approach that goes beyond just funding. Emphasizing other interventions such as preventive measures and improving access to quality healthcare services could be crucial in reducing malaria cases.

On the other hand, government spending on education was found to have a significant negative impact on the Malaria prevalence ratio in Nigeria in the short run. However, the impact though negative is not statistically significant in the long run. This suggests that investments in education particularly in health education and awareness programs can contribute to reducing malaria cases. Integrating malaria prevention and treatment messages into the educational curriculum, training healthcare workers and increasing public awareness campaigns could be effective in tackling malaria. The findings also showed a significant positive impact of out-of-pocket spending on themalaria incidence ratio. This implies that an increase in out-of-pocket spending will make households to be vulnerable to malaria. The finding highlights the importance of financial protection for individuals and households in accessing malaria prevention and treatment. Policymakers should consider implementing strategies to reduce out-of- pocket spending such as expanding health insurance coverage or implementing targeted subsidies for malaria-related services.

5.0 CONCLUSION AND RECOMMENDATIONS

This study examined the impact of government health expenditure on health outcomes in Nigeria. The malaria incidence ratio was used as a proxy for health outcomes while government expenditure was split into government health expenditure and government education expenditure as explanatory variables alongside the out-of-pocket health expenditure. The findings revealed that government spending on education has a significant impact on malaria incidence. Government education expenditure was also found to be significant for malaria prevention in the short run. Similarly, out-of-pocket spending on health was found to be significant in the malaria incidence rate. Based on the findings. The study recommends that government should try and strengthen the healthcare infrastructure such as improving the availability and accessibility of

healthcare facilities. The government should foster collaboration between the health and education sector. Health education should be integrated into schools training teacher and students on malaria prevention. In addition, the government should prioritize expanding health insurance coverage, particularly for vulnerable populations.

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Appendix

	MIR (per 1000 population)	GHE(%)	GEE(%)	OOPEX(%)
1988	500.0555444	2.18	7.52	51.33629812
1989	510.345465	2.21	11.59	53.23432244
1990	500.558575	1.38	6.63	53.43223451
1991	499.65654	1.62	3.29	54.22233341
1992	492.44345	0.28	0.55	54.33434443
1993	488.898887	2.83	6.5	54.44653344
1994	481.98092	2.33	8.21	55.56635323
1995	478.7877887	2.6	7.64	56.46453209
1996	471.0955	2.55	9.39	57.23645433
1997	460.21222	2.45	9.37	57.44222123
1998	450.67777	2.66	7.63	58.44334541
1999	450.77344	3.7	9.7	59.58755441
2000	438.7526127	3.3	12.56	60.16206741
2001	429.0423566	4.23	6.88	60.74782181
2002	412.9589519	5.83	11.56	65.04915619
2003	409.157078	3.38	6.58	72.81435394
2004	411.3888059	3.08	6.89	64.54787445
2005	415.2785741	4.21	6.26	65.97051239
2006	418.1665202	4.48	8.56	70.4588089
2007	421.3259206	5.15	9.49	70.93754578
2008	424.6553438	4.64	7.74	72.75693512
2009	416.587205	4.24	6.44	74.47493744
2010	398.9026203	3.19	5.49	76.87748718
2011	372.5571831	6.99	10.13	74.72514343
2012	347.7383259	5.95	10.48	72.84432983

2013	328.6545794	4.88	10.58	70.92673492
2014	314.4048621	5.72	10.03	71.85419464
2015	296.0814002	6.73	8.49	71.89008331
2016	281.3766366	4.83	8.16	75.18703461
2017	283.0640745	5.13	8.45	77.26951599
2018	291.9425142	5.22	8.2	75.94578552
2019	288.0494884	5.55	8.48	70.52402496
2020	279.554455	5.17	7.9	72.75112369
2021	275.0030343	4.22	6.79	73.55431243

Source: World Development Indicator and Central Bank of Nigeria Statistical Bulletin 2021

GHE(%) Government health spending as a percentage of total government expenditure

GEE(%) Government Education spending as a percentage of total government expenditure

OOPE(%) Out-of-Pocket Expenditure as a percentage of total health expenditure

MIR= Malaria Incidence Rate