



Analysis of the Impact of Government Health Expenditure on Maternal Mortality Rate in Nigeria

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Abstract

The maternal mortality rate in Nigeria remains a critical concern, reflecting not just a health crisis but a pressing need for comprehensive reforms to ensure the well-being of mothers and newborns. This study investigates the impact of Government health expenditure on maternal mortality rate in Nigeria from 1990 to 2021. The study analyzed secondary data collected using the multiple regression model of analysis. This study findings revealed that Government health expenditure (GHE) has no significant impact on the Maternal Mortality rate (MMR) in Nigeria within the study period. Also, the findings shows that access to good sanitation significantly reduces maternal mortality reduces maternal mortality by 3.8%. However, remittance and unemployment rate did not significantly affect maternal mortality. Based on the study findings the study recommended that Nigerian government should adopt policies that will increase public expenditure in the health sector. This implies that increasing public health expenditure would be greatly helpful in moving Nigeria toward the SDGs target for maternal mortality rate, although this is only a necessary condition in achieving those goals.

Keywords: Maternal Mortality Rate, Public Health expenditure, Sanitation, Urbanization **JEL Classification:**

Contribution to/Originality Knowledge

1.0 Introduction

In Nigeria, there has been a significant rise in government health spending, starting from NI5.22 billion in 2000 and escalating to NI79.99 billion in 2013, and further to N257.72 billion in 2015, reaching N296.44 billion in the first quarter of 2018. These figures represent 3.30%, 5.60%, 6.73%, and 5.22% respectively of the total recurrent expenditure, maternal and child mortality has remained seemingly high in Nigeria. In 2015, about 9 per cent deaths of newborn babies in the world occurred in Nigeria, thus placing Nigeria as the third country with highest maternal mortality aside India and Pakistan (Murunga, Mogeni & Kimolo, 2017), as it records 69.4% death rate per 1,000 infants, although this rates are higher in rural areas compared to their urban counterparts. In most developing economies like Nigeria, increase in budgetary allocation to social services, like health expenditure is highly desirable, though the increase by itself is not sufficient to guarantee enhancement in service delivery, even with the



advancement in medicine and technology which have aided the identification and fight against major childhood diseases, (Oyedele, 2017).

Although there is a bread consensus that government spending on health can definitely lead to improvement in health, (Peacock, and Wiseman 1967), the growth of Nigeria's economy in term of its GDP have not made the health condition in the country any better with continuous increase in maternal mortality. A cross-country study on maternal mortality rate-public health expenditure nexus usually shows income as the major determinant of a population's health status (Peacock & Wiseman, 1967), which is likely due to inefficiency, funds mismanagement and absence of professionals which characterized the public health sector of most developing economies like Nigeria, compared to its private counterpart which is perceived to be unaffordable by the citizen as a result of the high incidence of poverty.

In nations where corruption is prevalent, there tends to be a higher prevalence of maternal and infant mortality as well as lower life expectancy rates (Smith et al., 2010). The limited access to essential healthcare services and resources caused by environmental and social obstacles, such as rural isolation, the lack of healthcare facilities, and poverty, significantly contribute to the rise in maternal mortality and a decrease in life expectancy in Nigeria. Globally, approximately 99% of infant deaths occur in developing countries, with 86% attributed to infections, premature births, delivery complications, prenatal asphyxia, and birth injuries (Johnson & Brown, 2018). Further research is necessary to assess the impact of government healthcare spending on maternal mortality rates, given the ongoing increase in mortality rates in Nigeria.

Most of these earlier studies focused majorly on aggregate public expenditure but did give attention to health expenditure per head and total expenditure scaled by the gross domestic product. Against this background, this study therefore intend to investigates the link between public health expenditure and health outcomes in Nigeria, using health expenditure per head and total expenditure scaled by gross domestic product as proxies for health expenditure. In addition, more recent and updated datasets are deployed, making the findings a reflection of current realities in this sector. This study is aimed at providing answer to the following question: What is the impact of government health expenditure on maternal mortality rates in Nigeria? The main objective is to assess the analysis of the impact of government health expenditure to be achieved is to: Examine the impact of government health expenditure on maternal mortality rates in Nigeria.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Health Expenditure

Health expenditures encompass various elements aimed at enhancing health outcomes, irrespective of the entity responsible for providing or funding the services. According to the World Bank (2014), health expenditure encompasses preventive and curative health services, family planning, nutrition initiatives, and emergency aid directed towards health-related issues,



excluding water and sanitation provisions. Alternatively, the World Health Organization (2015) defines health expenditure as the total consumption of health goods and services along with investments in healthcare infrastructure. Health plays a pivotal role in assessing the standard of living within a nation or region, intertwining with variables like water, sanitation, and nutrition. When health improves alongside these factors, it becomes both an input to and a consequence of developmental efforts, contributing to socio-economic advancement and human welfare. Enhancements in population health yield social returns, bolstering individual and communal participation in economic activities, enhancing productivity, and ultimately elevating living standards. Moreover, improved health status reduces absenteeism, lessens disease burdens, and optimizes resource allocation for healthcare services, amplifying coverage and management efficiency. Healthcare consumption constitutes individual health investment, contingent upon the accessibility and availability of healthcare services, while healthcare infrastructure and personnel represent state-level health investments. Hence, individuals utilize healthcare facilities provided by the state to enhance their health status. Within the framework of production functions, healthcare is recognized as a pivotal input in health production, with increased healthcare investment correlating with economic growth and poverty alleviation due to its positive impact on productivity (Abdullahi, 2019). Consequently, healthcare is instrumental in producing favorable health outcomes such as reduced mortality rates and increased life expectancy, epitomizing its role as a vital input in the health production process. Whether viewed from a macroeconomic or microeconomic standpoint, healthcare serves as a crucial avenue for individuals to enhance their health status, contingent upon the accessibility and availability of health resources. Health expenditures are categorized into public and private expenditures, each playing a distinctive role in shaping healthcare accessibility and quality.

Public expenditure according to Nnamocha (2008) is the expenditure of the public sector (government). It includes such expenditure on the maintenance of government itself and also for the society and the economy. The rising trend in the growth of public expenditure is a worrisome development to the traditional Economist like the classical theorist who believed that government roles in the economy should be minimal because the extolled the virtue of the "invisible hand" through the working of market mechanism. Emerenini (2005) observed that the price system alone is incapable of bringing about social justice through equitable distribution of wealth and income. He further maintained that the economy fall short of desired stability.

Public health expenditure includes publicly funded health care by public owned health care providers such as state, regional and local government bodies and social security scheme. These include public finance investment in health facilities plus capital transfer for hospital construction and equipment and subsidies from government to health care service providers. It includes funds for state employees. It could be totality of money spent on health infrastructures, health environmental hazard, laboratories maintenance etc.

Private health expenditure includes direct household (out-of-pocket) spending, private insurance, charitable donation, and direct service payments by private corporations (WHO, 2019). The part of total expenditure on health that is not public. Private spending on health



refers to expenditure funded by private source which are house hold and other private entities. This indicator is shown as a percentage of GDP, divided into primary, secondary and tertiary health institutions.

2.1.2 Maternal Mortality Rate

Maternal mortality rate is defined by the World Health Organization as the death of a woman from pregnancy-related causes during pregnancy or within 42 days of pregnancy, expressed as a ratio to 100,000 live births in the population being studied (World Health Organization, 2004).

World Health Organization (2016) is of the view that maternal mortality is the death of a woman while pregnant, or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to, or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

According to the United Nations MDGs, the target for any nation, is to reduce by two – thirds between 1990 and 2018 the under – five-mortality rate and reduce by three quarters, between 1990 and 2018, the maternal mortality ratio. However, nearly 11 million children under the age of five die in the world every year or well over 1,200 every hour, most from easily preventable or treatable causes. Again, 500,000 women die in pregnancy or childbirth each year, or one every minute. Over her lifetime, a woman in sub-Saharan Africa faces a 1-in-16 chance of dying in childbirth compared with 1-in-160 in other regions of the world.

Globally in 2015, an estimated 303,000 women died while pregnant or within 42 days of the end of pregnancy. This number corresponds to a ratio of 216 maternal deaths per 100,000 live births and to a 1-in-180 lifetime risk for pregnancy-related death for each girl entering her childbearing years. According to the World Health Organization (WHO 2018), "No issue is more central to global well-being than maternal and prenatal health. Every individual, every family and every community is at some point intimately involved in pregnancy and the success of childbirth."

More than 99% of maternal deaths occur in low- and middle-income countries, with 84% in either sub-Saharan Africa or South Asia Between 1990 and 2015, the global maternal mortality ratio (MMR) fell by 44%, an impressive improvement, but less than the 75% reduction targeted by the Millennium Development Goals. In 2015, the United Nations issued 17 Sustainable Development Goals, including a commitment to reduce the global MMR to less than 70 per 100,000 live births by 2030, with no single country having an MMR of more than 140. Several regions will require substantial investment to meet this goal, most notably sub-Saharan Africa, where the lifetime risk for maternal death remains remarkably high, at 1 in 36.1 there is considerable regional variation. Within sub-Saharan Africa, the highest MMRs are in Sierra Leone (1360), Central African Republic (882), and Chad (856) and represent rates that are 10-fold higher than the lowest ratios in the region. Throughout the world, war, natural disaster, and political conflict can degrade health systems and trigger a rise in deaths caused by complications that would be treatable under stable conditions.



2.2 Theoretical Review

2.2.1 Adolph Wagner Theory of Health Expenditure

The theory applied in this paper was Adolph Wagner theory. The early theory of public expenditure can be attributed to Adolph Wagner, a prominent German economist of the 19th century. In 1883, Wagner proposed a developmental thesis suggesting that as a nation progresses, its public sector spending becomes increasingly significant. He emphasized the correlation between the share of Gross National Product (GNP) consumed by the public sector and the development of the nation. Wagner observed a growing trend in the public sectors of various European countries, the United States, and Japan during the 19th century. He identified three factors driving the disproportionate growth of state activity compared to other sectors of the economy. Firstly, he noted that as economies become more specialized and social structures more fragmented due to increased division of labor, there is a greater need for government intervention in areas such as administration and law enforcement. Secondly, he anticipated an uptick in cultural and welfare expenditures, particularly in education, which he viewed as superior goods with high income elasticity of demand. Thirdly, Wagner foresaw the necessity for the government to step in and provide certain economic services, such as large-scale infrastructure projects like railroad construction, when the private sector becomes inadequate. Wagner's Law posits that government expands in response to the increasing demand for public goods and the need to regulate externalities. This theory is based on empirical observations in various industrializing countries and is explanatory rather than prescriptive. It suggests a causal relationship from national income to public sector expenditure, implying that public expenditure is endogenous to national income growth, contrary to the Keynesian view which treats public spending as an exogenous policy instrument. The validity of Wagner's Law has been tested empirically across a range of developing and developed countries using different datasets. However, critics argue that an expanding public sector may lead to inefficiencies compared to market mechanisms in resource allocation, and may distort incentive systems through regulatory and fiscal policies. Additionally, rapid growth in public expenditure can result in structural shifts favoring the public service sector, particularly in areas such as healthcare, which heavily rely on public funding.

2.2 Empirical Review

Leaning on the above, Ahmed and Hasan (2021) conducted a study on the correlation between public health spending, governance, and maternal mortality rates in Malaysia spanning from 1984 to 2009. Employing an Autoregressive Distributed Lag (ARDL) co-integration framework, their findings, based on bounds testing, indicated a sustained, long-term relationship between health outcomes and factors such as income level, public health expenditure, corruption, and government stability. The study underscored the significant impact of public health spending and corruption on both short and long-term health outcomes, emphasizing the need for robust health programs alongside efforts to mitigate corruption for enhancing the country's quality of life.

Rana, Alam and Gow (2020) investigated the relationship between health expenditure and maternal health outcomes for 161 countries over the period 1995–2014. Using cross-sectional



augmented unit root, panel autoregressive distributed lag and Toda-Yamamoto approach to Granger causality tests were also used to investigate the relationship across four income groups. They found that health expenditure and health outcome link is stronger for low-income compared to high-income countries. Moreover, rising health expenditure can reduce child mortality but has an insignificant relationship with maternal mortality at all income levels. Lower-income countries are more at risk of adverse impact on health because of negative shocks to health expenditure. They concluded that influence of health expenditure on health outcome varies significantly across different income levels except for maternal health. Policymakers should recognize that increasing spending has a minute potential to improve maternal health.

Adofu and Salami (2019) examined the impact of healthcare expenditure on maternal mortality in a panel of 45 African countries. Using fixed effect method and pooled Ordinary Least Square (OLS) estimation technique, it was found that the impact of healthcare expenditure differs across different regions of Africa. While the effect is negative in Central and Western regions of Africa, it is positive in Southern region of Africa. It is concluded that the impact of healthcare expenditure on maternal mortality varies across different regions of Africa. It is therefore recommended that policy makers and regional organisations in Africa should design platforms that will improve not only maternal health, but overall health status of People in Africa.

Nwankwo (2018) examined the effects of public health spending on maternal mortality for the period of 2003 to 2015 among 25 States in Nigeria. Using a panel two-stage least square and controlling for female per capita income, female literacy rate, and urbanization rate, it found that a percentage increase in public health reduced maternal mortality rate in Nigeria by approximately 6 deaths per 1000 live births. The study also found that Female literacy rate and urbanization have significant and negative effect on the maternal mortality rate of the country. The study concluded that public health expenditure is a vital factor in reducing incidences of maternal mortality in Nigeria. The author recommended that women education and improvement in their income should be given positive attention to reduce maternal mortality rate in the Nigeria.

Nikoloski and Amendah (2018) delved into the effects of health expenditure on various health indicators, including neonatal and under-five mortality rates, lifetime exposure to maternal mortality, and life expectancy at birth across 14 African countries from 2002 to 2014. Through the application of Autoregressive Distributed Lag (ARDL) modeling and panel static estimations, they observed that while there wasn't a direct correlation between per capita health expenditures and certain reproductive health metrics, public health expenditures notably contributed to improved life expectancy at birth and reduced neonatal and child mortality rates. Interestingly, their analysis suggested that private health expenditures exerted a significant influence on neonatal mortality. The study concluded that public health spending demonstrated a more pronounced impact compared to private expenditure.

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Zahra, Sara and Arash (2015) developed a model where government health expenditure was interacted with the impact of governance in the nine OPEC countries between 1996 and 2012 and its effect on maternal mortality rate and under-5 was studied. The study showed that expenditure on public health has a negative significant effect on infant and child mortality rate in countries where there is good governance. The equations of the model were estimated using Fully Modified Ordinary Least Square (FMOLS). This analysis from this study implies that in a country where governance is weak, for example, where the level of corruption in the economy is too high, public allocations to different sectors of the economy are likely not going to yield the expected result. This result agrees with the work of Achim et al. (2020), Makute and O'Hare (2015), Yaqub, Ojapinwa and Yussuff (2012), and Rajkumar and Swaroop (2007).

Maruthappu, Ng, Williams, Atun, Agrawal, and Zeltner (2015) examined the association between reductions in government healthcare spending and maternal mortality in 24 countries in the European Union (EU) over a 30-year period, 1981–2010. Using multivariate regression analysis and controlling for country-specific differences in healthcare, infrastructure, population size and demographic structure, it was found that an annual 1% decrease in government health expenditure is associated with significant rises in maternal mortality rates. They found that the association remained significant after accounting for economic, infrastructure and hospital resource controls, in addition to out-of-pocket expenditure, private health spending and total fertility rate. They however found that the significance of the effects is removed after accounting for births attended by skilled staff. They concluded that reductions in government health expenditure were significantly associated with increased maternal mortality rates, and that the implementation of austerity measures and budgetary reductions may worsen maternal mortality in the EU.

Matthew, Adegboye and Fasina (2015) investigated the influence of public health expenditure on maternal mortality rate in Nigeria from 1979 to 2012. The study made use of the Johansen co-integration and the Vector Error Correction Model (VECM) econometric technique to determine the long run association between public spending on health and maternal mortality rate. The study revealed that public expenditure on health has a significant connection with maternal mortality rate in Nigeria.

Boachie and Ramu (2015) examined the relationship between public health expenditure and health status in Ghana for a period of 1990-2002 using the OLS and Newey-White estimation technique. After controlling for real per capita income, literacy level and female participation



in the labour market, the study found evidence that the declining infant mortality rate in Ghana is explained by public health spending among other factors. Thus, they concluded that public healthcare expenditure is associated with improvement in health status through reduction in infant mortality.

Kim and Lane (2013) used maternal mortality rate and life expectancy at birth as indicators of public health. The data was collected from 17 OECD countries between 1973 and 2000 to analyze cross-country panel data; mixed-effect model was also used. A statistically significant association was found between government health expenditure and maternal mortality rate. The result indicates that while public health expenditure significantly influences maternal mortality rate negatively, life expectancy at birth is positively influenced.

Novignon, Olakojo, and Nonvignon (2012) conducted a comprehensive investigation into the effects of both public and private healthcare expenditure on health outcomes across 44 Sub-Saharan African countries using panel data spanning from 1995 to 2010. Utilizing fixed and random effects panel data regression models, they assessed the impact of healthcare expenditure on population health status and distinguished between the effects of public and private expenditure sources. Their findings highlighted a substantial positive association between healthcare expenditure and health status, as evidenced by improvements in life expectancy and reductions in mortality rates. Notably, both public and private healthcare spending demonstrated significant contributions to health status, although public healthcare spending exhibited a relatively stronger impact.

In the Nigeria society, Yaqub, Ojapinwa and Yusuf (2012) considered the effectiveness of expenditure of government on health and the influence on governance. Governance variables was proxies by the corruption perception indicator, while health outcome variable were infant mortality, child below five years mortality rate and expectancy, employing both the ordinary least squares and the two-stage least square as tools of analysis. Their results and child below five years mortality rate with the inclusion of government indicators.

Tim, Stephanie, Lisa, Ann and Wendy (2010) analyzed the impact of economic recession, measured as GDP per capita, on maternal and infant mortality. The study employed first different logarithmic model to examine the association between previous economic recession and booms. Data were collected on fourteen (14) high and middle income countries from 1936 to 2005, while different models were estimated for four different periods. The study found a significant association between maternal mortality and economic recession, an infant mortality and economic recession from 1936 to 1965. But individual country data displayed distinctive patterns of responses in economic change, as Canada and Japan were much affected by economic shocks in the post-war period, while US, Italy and UK were fairly affected.

3.0 Research Methodology

3.1 Research Design

This study therefore adopted a quantitative time-series research design. A time-series study follows the same sample over time and makes repeated observations (Forgues, Bernard &



Vandangeon-Derumez, 2011). Time-series research designs describe patterns of change and help establish the direction and magnitude of causal relationships. Measurements are taken on each variable over two or more distinct time periods. This allows the researcher to measure change in variables over time.

3.2 Data Sources

The study relied on secondary data and utilized annual time series data. Empirical investigation was carried out in order to analyse the impact of public health expenditure on Population health maternal mortality in rate in Nigeria, this study adopted the model specification used by Anyanwu and Erhijakpor (2007) with some modifications.

3.4 Model Specification and Measurement

In the model, the effect of public health expenditures and other controls on maternal mortality rate is captured.

Maternal Mortality Rate = f(Government Health Expenditure, Education, Remittance, Urban Population, Unemployment, Sanitation)

$$MMR_{t} = \alpha_{0} + \beta_{1}GHE_{t} + \beta_{2}EDUC_{t} + \beta_{3}REMITT_{t} + \beta_{4}UNEMP_{t} + \beta_{5}URBANPOP_{t} + \beta_{6}SANITATION_{t} + \varepsilon_{t}$$

Where;

- MMR = Maternal mortality ratio (modelled estimate, per 100,000 live birth)
- GHE = Government Health Expenditure (domestic general government health expenditure, % of general government expenditure)
- EDUC = Number of school Enrolment

SANITATION = Sanitation (people using at least basic sanitation services, % of pop)

UNEMP = Unemployment (% of total labour force modelled ILO estimate)

URBANPOP = Urban population (urban population growth at annual %)

- REMITT = Remittance
- α_0 = Intercept or autonomous parameter estimate

 $\beta_1, \beta_2, \beta_1 > 0, \dots, \beta_6$ are parameter co-efficient of, Maternal Mortality Rate,

 \mathcal{E}_t , μ_t are the error terms



4.0 **Results and Discussion**

The study examines the changes in maternal mortality over the period of analysis. This is important especially in the light of several interventions such as that have been embarked upon to improve maternal health. From the plot in figure 4.2, it is clear that the maternal mortality trend appears to be erratic. Within the period of analysis, maternal mortality experienced a rising trend between 1990 and peaked in 1998. The rising trend reverted in 1999 and perhaps this can be attributed to the commencement of the MDGs. In comparison to 2000, maternal mortality has declined from about 390 deaths per 100,000 women to 356 deaths per 100,000. However, this is still considered unacceptable as the majority of the deaths are avoidable. Interestingly, from the plot, there appears to be a rising trend. While it is unclear why this is so, a plausible explanation could be the seemingly rise in the number dying from childbirths especially due to complications.



Figure 1: Maternal Mortality



	MMR	GHEXP	SANITATION	SE	REMIT	UNEMP	UPOP
Mean	5.917063	3.767037	3.159432	-0.111009	3.380671	4.175906	4.490582
Median	5.916302	4.449439	3.119959	-0.153083	3.819301	3.899000	4.302378
Maximum	5.966506	5.663308	3.418038	0.270011	8.333830	5.999000	5.492673
Minimum	5.877775	-0.261365	3.011526	-0.240798	0.018522	3.700000	3.911588
Std. Dev.	0.022112	1.946158	0.131695	0.114889	2.356120	0.667430	0.410179
Skewness	0.187667	-0.791925	0.564122	1.661020	0.172568	1.792386	0.471147
Kurtosis	2.353610	2.249238	1.908472	5.910389	1.863255	4.860038	2.087517
Jarque-	0.744928	4.096296	3.285822	26.00841	1.881746	21.74711	2.294057
Bera							
Probability	0.689035	0.128974	0.193416	0.000002	0.390287	0.000019	0.317579
Sum	189.3460	120.5452	101.1018	-3.552294	108.1815	133.6290	143.6986
Sum Sq.De	0.015157	117.4135	0.537650	0.409186	172.0903	13.80936	5.215663
Observation	32	32	32	32	32	32	32

Table 1: Variable Summary

Source: Authors' computation Using E-views 9

Table 1 This is the summary of all the variables used in this study including the dependent variable; maternal mortality (MMR), the main independent variable government health expenditure (GHEXP), school enrolment (SE), Sanitation, unemployment rate (UNEMP), remittance (REMIT), and urban population (UPOP). The periods for the analysis span through 32 years with 32 observations for each variable ensuring that there is balance. All variables are logged, apart from remittance, unemployment and urban population which are in percentage.

Table 1 shows that MMR has a mean value of 5.91 and a median of 5.91 with maximum and minimum values of 5.96 and 5.87 respectively. The standard deviation value is 0.02 with a skewness value of 0.18, the kurtosis value is 2.35 with Jarque Bera statistic value of 0.74 and probability value of 0.68 which is greater than 5% indicated that maternal mortality is normally distributed.

In the case of GHE we estimated a mean value of 3.77 and a median of 4.45. The maximum and minimum values are 5.66 and -0.26 respectively. The standard deviation is 1.95 with a skewness value of -0.79, the kurtosis value is 2.25, Jarque-Bera statistic is 4.09 and probability value is 0.13 which is greater than 5% meaning that GHE is also normally distributed.

All the other control variables in the study have distributions that are positively skewed (having skewness or asymmetry or tapering) in nominal values i.e. having positive signs with mean values and their medians in nominal values. All variables are having positive maximum and minimum values except school enrolment with negative minimum value and in term of kurtosis all variables have acceptable distribution values. On the Jarque-Bera, the variables residuals appeared to be normally distributed by having probability values which are more than 5% except for school enrolment and unemployment



The result of the regression analysis is presented below by analysing individual Model of the study.

Dependent Variable: Maternal Mortality rate					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Health Expenditure	0.006436	0.005583	1.152805	0.2608	
Health Expenditure (-1)	0.009645	0.005676	1.699162	0.1028	
School Enrolment	0.074330	0.032778	2.267721	0.0331	
Sanitation	-0.415379	0.059091	-7.029423	0.0000	
Remittance	-0.000525	0.001068	-0.491225	0.6279	
Unemployment	0.001816	0.005618	0.323288	0.7494	
Urban Population	-0.038891	0.008145	-4.774750	0.0001	
С	7.346607	0.186192	39.45719	0.0000	
R-squared	0.890503	Mean dependent var		5.917608	
Adjusted R-squared	0.857178	S.D. dependent var		0.022257	
S.E. of regression	0.008411	Akaike info criterion		-6.500819	
Sum squared resid	0.001627	Schwarz criterion		-6.130758	
Log likelihood	108.7627	Hannan-Quinn criter.		-6.380189	
F-statistic	26.72159	Durbin-Watson stat		1.979406	
Prob(F-statistic)	0.000000				

Table 2

Source: Authors' computation using E-views 9

Table 2 shows the result of the model estimated to ascertain the effects of government health expenditure on maternal mortality rate in Nigeria in the presence of other control variables. The lagged value of health expenditure is included in order to control for serial correlation and endogenous covariates. The result shows that government health expenditure does not significantly impact maternal mortality rate in Nigeria. For other control variables in the model, the result shows that access to good sanitation significantly reduces maternal mortality at coefficient effect size of 41%. Also, urbanization proxied by urban population growth also significantly reduces maternal mortality by 3.8%. However, remittance and unemployment rate did not significantly affect maternal mortality. Finally, the result shows an R^2 value of 0.89 and F-Statistic probability value of 0.00, showing that model explains 89% of variations in maternal mortality and is significant respectively.

To test the hypothesis of this study, the Wald Test of Coefficient Restrictions is used.

 H_{01} : Government health expenditure has no significant impact on maternal mortality rate in Nigeria.

Wald Test			
Test Statistic	Value	Df	Probability
t-statistic	1.152805	23	0.2608
F-statistic	1.328959	(1, 23)	0.2608

Table 4: Maternal Mortality

Chi-square	1.328959	1	0.2490

Source: Authors' computation using Eviews-9

From table 4, the probability value of the F-statistic and Chi-Square are more than >0.05 suggesting that they are not significant at 0.05 significance level. Hence, the null hypothesis is upheld and we conclude that government health expenditure does not significantly impact maternal mortality in Nigeria.

The findings of the studies revealed that Government health expenditure did not significantly impact maternal mortality in Nigeria. The findings of the study reveal interesting insights into the relationship between government health expenditure and key health indicators in Nigeria. The implication of this finding is that government health expenditure did not have a significant impact on maternal mortality rates. Several factors could contribute to this result, such as the complex nature of maternal health issues, including socio-cultural factors, limited access to quality healthcare services, and the need for comprehensive interventions beyond healthcare spending alone. This research finding was also found to be similar to the results of Adofu and Salami (2019), examined the impact of healthcare expenditure on maternal mortality in a panel of 45 African countries and found that the impact of healthcare expenditure differs across different regions of Africa. While the effect is negative in Central and Western regions of Africa, it is positive in Southern region of Africa.

5.0 Conclusion and Recommendations

Government in Nigeria, over the years, has been making frantic efforts at ensuring that there is an increase in the level of public expenditure on health to improve population health outcomes in the country. However, this has not led to appreciable maternal mortality rate. It is apparent from this very study that health expenditure by the government in Nigeria had a significant negative effect on maternal mortality for the period under review

Also, the Nigerian government at all levels should re-prioritize such that more funds should be earmarked and deployed into building more hospital structures and equipment. This, of course, should be consummated by adequate and motivated manpower in the health sector in order to make health care services affordable and accessible to the under-5 and infants as well. Moreover, the government at various levels should spend adequate funds on all the tiers (primary, secondary and tertiary)

Based on the findings of this study, the following recommendations are made:

- i. Government should increase public health expenditure at both the federal, state and local government levels because at present, public health spending as a percentage of GDP is less than 2.5% threshold as recommended by WHO. This will in no small measure help in reducing the ever-increasing incidences of mortality rate while increasing life expectancy of the average Nigerian citizen.
- ii. Government or policy makers should focus on an overall health reform programme that involve maternal education, access to health care services,



access to water and sanitation and women empowerment which will enable then to make informed decision on issue relating to their reproductive life.

- iii. Nigerian government should adopt policies that will improve the performance of health sector toward achieving the SDGs target for health, although this is only a necessary condition in achieving those goals. This is suggesting that government should endeavor to improve income equality among citizens through its redistribution role in order to afford an increasing portion of the population access to larger income that will finance health care.
- iv. More attention should be given to health orientation by educating the masses on benefits of health protection, prevention and promotion, as health education was found significant in improvement of population health outcomes

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