



American Journal of Economics and Business Innovation (AJEBI)

ISSN: 2831-5588 (ONLINE), 2832-4862 (PRINT)

VOLUME 4 ISSUE 3 (2025)

**PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA**

Maternal Mortality in Nigeria and Implications for Economic Development

Adeniyi Idowu Okeowo^{1*}, Abayomi Oluwaseun Japinye², Segun Amos Adewale¹

Article Information

Received: June 20, 2025

Accepted: July 24, 2025

Published: October 07, 2025

Keywords

*Fertility Rate, Health Expenditure,
Maternal Mortality, Race*

ABSTRACT

The study examined maternal mortality in Nigeria and its implications for economic development, and it considered the impacts of the maternal mortality ratio on economic growth. The study uses annual time series data spanning 33 observations from 1989 to 2022. Thus, the data's primary sources are the World Health Organization and the World Bank Development Indicators, 2022. Gross Domestic Product (GDP) serves as the proxy for economic growth, which is the dependent variable, while Fertility Rate (FERATE), Health Expenditure (HEAEXP), and Maternal Mortality Rate (MMR) serve as the exogenous variables. Augmented Dickey-Fuller (ADF) test was utilised to determine the stationarity level of the variables. The Bound and Co-integration Tests show that there exists a long-run relationship among the variables and Fully- modified OLS (FOLS) was used to analyse the Maternal Mortality in Nigeria and Implications for Economic Development from 1989 to 2022 using the E-Views 10 statistical software. In contrast to MMR and FERATE, which have negative relationships with the dependent variable (Gross Domestic Product), HEAEXP has a positive relationship with the dependent variable. The following recommendations were made: Nigeria should increase access to family planning, enhance maternal health services, and provide incentives for smaller families to spur economic growth. Public-private partnerships and open budgeting combined with efficient health spending can improve productivity and healthcare. Lastly, cross-sector cooperation integrating health and economic policies would promote sustainable growth and higher living standards nationwide.

INTRODUCTION

The high maternal mortality figures in Nigeria are not just a serious public health issue, but a pressing concern that demands immediate attention. Nigeria, with one of the highest rates of maternal mortality in the world, records 59,000 maternal deaths every year. The ongoing effort to reduce these figures is hindered by challenges such as poverty, cultural values, and poor healthcare infrastructure. These factors limit women's access to essential maternal health services, leading to high rates of maternal mortality and morbidity. The complex relationship between maternal mortality and economic development is a call for urgent action. High maternal mortality does not only reflect the quality of healthcare service provided but also perpetuates the cycle of poverty, hindering the nation's ability to develop and grow sustainably.

The need for a different socio-economic trajectory becomes even more apparent considering the high rate of maternal mortality that weakens Nigeria's rate of the labour force and intensifies health care costs. When we critically analyse the persistent incidences of maternal deaths, we indeed observe that these deaths entail human losses that reverberate not only in small circles of families but also in a complex way that impacts national economic viability. Crucially, it is worth noting that such economic losses incur whenever a maternal death occurs because it contributes to reductions in the workforce and increases the care burden with a subsequent likelihood of entrenching poverty cycles (Ogunjimi & Adebayo, 2019). Importantly, high-quality health services are needed not

just as a 'luxury' but as a fundamental. It will likely make economic sense for countries to pump more money into their health sectors because there are positive correlations between higher health spending and GDP growth (Nwankwo *et al.*, 2022).

Critically, we must reconsider the state's role and the private role in shaping health and socio-economic outcomes by recognising that investing in rural maternal health services will avert maternal deaths, and this will perhaps achieve a dual health and economic impact in terms of addressing health and poverty. At last, we must ask to what extent maternal health successes bring about broader socio-economic improvements. Overall, we must critically think through the prospects of maternal health interventions succeeding in the long term so that they can help bring sustainable development and ensure the Sustainability Development Goals (SDGs) are met (Liadi *et al.*, 2024).

Nearly 59,000 women die each year due to complications of pregnancy and childbirth in a population of 200 million, which makes it a major public health crisis and also contributes to the loss of a significant amount of economic productivity. With all its possible repercussions for the future, this crisis is also an opportunity for immense positive change. The contributing factors include a fragile health system that was not able to scale up access to skilled birth attendance, weak social protective measures, and socio-cultural factors such as stigma, lack of awareness, and poor uptake of care, which still discourage women from seeking proper medical care in time.

¹ Department of Economics, Caleb University, Imota, Lagos, Nigeria

² Central Bank of Nigeria, Nigeria

* Corresponding author's e-mail: adeniyi.okeowo@calebuniversity.edu.ng

The maternal mortality ratio, at about 540 deaths per 100,000 live births, illustrates the need to focus on the immediate health risks as well as how maternal deaths affect the productivity of the economy and cause increased expenses on health systems, thus creating costs that the country's overall economic growth cannot sustain. Investing in maternal health care programs and removing barriers leads to fewer maternal deaths. In fact, the state of maternal deaths in Nigeria has been linked to an equivalent lack of investments in maternal health programs by successive governments.

When less government money is forthcoming, maternal mortality ratios increase, and the economy contracts. The challenge of maternal mortality is multifactorial, with both access to health care and socio-economic reforms critical to solving the crisis. This is where the audience's role becomes crucial. Nigeria must improve women's education and economic position, and the audience, including policymakers, researchers, and stakeholders, is essential to this process. The more educated and empowered women are, the more likely they are to receive care. A trajectory of improved health, prosperity, and development is one upon which the audience can act to effect reforms. The audience is important and integral to the country's brighter future.

A straightforward research program needs to be established to show how maternal mortality undermines economic development as it relates to the socio-economic dynamics of Nigeria. The main objectives include assessing the relationship between maternal mortality and government health expenditure. Lack of investment in health has been identified as the cause of higher mortality that affects economic productivity (Gao *et al.*, 2023). Also, the research objective is to evaluate the socio-economic determinants of maternal health, focusing on education and employment opportunities for women, as they have been proven to be the main determinants of maternal mortality (Osemwengie & Shaibu, 2020). These relationships between the social determinants and maternal mortality must be understood to formulate policies that will reduce maternal deaths while general economic health is improved (Dias *et al.*, 2015).

Overall, the research aims to give the required actionable guidelines that inform government policies and activities to ensure that Nigeria realises sustainable development while achieving better maternal health outcomes. The findings of this research can potentially inform and shape policies and practices in the fields of public health, economics, and social development, leading to improved maternal health outcomes and sustainable development in Nigeria.

Apart from the central argument in the study, there should be a succinct formulation of the research questions to provide an anchor for exploring the problem within its broader socio-economic context. These questions are essential to gripping current problems and shaping targeted reform agendas and a deeper understanding of the dynamics of socio-economic issues. For

instance, the question 'How do specific socio-economic determinants, such as the proportion of women with at least secondary education and the proportion of women using informal community health workers, influence maternal mortality rates in Nigeria?' is a sign of a whole other set of complicated questions to unpack. As Igboanugo and MaryNwakeze (2023) stress: 'The economic determinants of maternal mortality in Nigeria is an extremely multifactorial question that is influenced by employment, health spending, and women's education (as a driver of economic growth and development).' As Vincent (2021) rightly asks: 'When there is adequate government spending on maternal healthcare, will there be any systemic effects on mortality rates or growth?' This question becomes a critical concern given that 'an estimated 59,000 women die annually from causes related to pregnancy and childbirth' (Olonade *et al.*, 2019).

This study examines the relationship between maternal mortality and economic growth in Nigeria, emphasising the most important hypotheses. It is hypothesised that the extension of the government's fiscal expenditure on health reduces maternal mortality rates, and improvement in female education lowers the mortality rate considerably because of better health knowledge and access to health services. Also, socio-economic factors such as poverty reduction and healthcare access will likely mediate the relationship between maternal health and economic productivity. Testing these hypotheses will be a highly effective method to separate these connections and clarify the nature of direct policy action.

As such, this research is important to health policies and broader economic planning, including efforts to achieve a viable and forward-looking African country such as Nigeria: 'Maternal mortality affects productivity and the workforce.' Economic planning at all levels would benefit from stronger health systems and increased investment in maternal health services. The findings provide data that informs policymakers on developing a comprehensive set of processes to tackle maternal health. Currently, approximately 59,000 women die yearly from pregnancy-related complications, a startlingly high rate for a nation with 200 million inhabitants. This alarming statistic represents one of the leading public health crises and a substantial loss of economic productivity. However, it also presents an opportunity for significant positive change. Factors contributing to this crisis include a fragile healthcare system that has not been able to scale up access to skilled birth attendance, poor social protective measures, and persisting socio-cultural barriers such as stigma and poor awareness, which discourage women from seeking appropriate medical care on time. Overcoming these challenges reduces families' financial burden and improves social and economic resilience.

LITERATURE REVIEW

Global Overview of Maternal Mortality and Economic Development

The relationship between economic development in

Nigeria and maternal mortality has received significant attention. Researchers have closely examined the link between economic progress and maternal health due to the widespread impact of high maternal mortality rates (Dias *et al.*, 2015). Evidence from the literature indicates that there is a clear correlation between the financial burden of maternal death, especially in regions characterised by severe social disparities, and the amount of money spent on healthcare and the availability of high-quality medical services (Nwankwo *et al.*, 2022). This requires a deeper analysis of the claimed returns on public health investments. Gendered inequalities, deeply rooted in socio-cultural factors, significantly limit women's access to health resources and jeopardise maternal health outcomes. These inequalities, often perpetuated by entrenched cultural ideologies, underscore the need for gender-sensitive policies and interventions (Ogunjimi & Adebayo, 2019).

The literature shows that improving female education and access to health care is not just a health intervention. Instead, it is a direct economic intervention that materially reduces maternal mortality while creating the conditions for further economic growth by producing a healthier workforce (Olonade *et al.*, 2019). Taking deliberate policy steps to address these multiple challenges and engaging communities through community health literacy programmes can help Nigeria reach some of the sustainable development goals – goals that promote better maternal health outcomes (Van Niel *et al.*, 2020; Olonade *et al.*, 2019). Reimagining a new economic future will require critically interrogating the relationship between economic development and maternal morbidity and mortality. It is crucial to consider new liberatory economic interventions that work not just at the level of material resources but also with social and cultural factors. A comprehensive approach that addresses all these factors is essential for significant change.

A side-by-side comparison of Nigeria's maternal mortality rates with those in other African countries strongly demonstrates that these are unjustifiable. These reasons are not evident and will take another paper to address. However, it is sufficient to state that the health infrastructure is poor, the society is not sufficiently equitable, and the health sector is grossly underfunded. These factors and others contributed to Nigeria having 19 per cent of the world's maternal mortality in 2017. However, we should insist on knowing why maternal mortality in Nigeria remains at a concerning figure of 917 per 100,000 live births despite some positive trends that occurred over the years. In 2017, it was 26 per cent higher than the regional average of 546 per 100,000 live births (Dauda, 2023). By contrast, South Africa did much better: 120 maternal deaths per 100,000 in the same year (Nwankwo *et al.*, 2022). This stark contrast underscores the urgent need for societal change to address inequity.

An important question to ask is: What are the specific health policies being implemented by South Africa that are different from what Nigeria does? Moreover, Rwanda

presents a rare opportunity for innovative research and practice. Between 1990 and 2017, Rwanda improved several critical health indicators and maternal mortality tremendously: the maternal mortality ratio (MMR) decreased from 1,100/100,000 live births in 1990 to 350/100,000 in 2017 (Jaiswal *et al.*, 2024). The rate is now almost identical to the regional average.⁷ An important question is: what are the specific health policies being implemented in Rwanda, and can these be adapted for Nigeria's context?

On the other hand, there are broader problems, such as inadequate healthcare infrastructure, consistent under-investment, and social-cultural practices, that could explain why Nigeria's maternal mortality rates are not too different from other African countries on average. These include the fact that 'many women in Nigeria still travel long distances to access routine care, with approximately 20-35 percent of women having to travel more than 20 km from their homes to the nearest healthcare facility' at any given time (Osemwengie & Shaibu, 2020). There is undoubtedly a need for the Nigerian government to make focused policy reforms to equip the healthcare system to address the issues at the root cause. Strategic investments in healthcare, inspired by successful models in other African countries, will help Nigeria to better aligned with what other African countries have done (Odey *et al.*, 2024; Jaiswal *et al.*, 2024). Through this holistic view of the issues, stakeholders can begin to address the bigger picture and ultimately drive improvement.

Causes of Maternal Mortality

For all the progress achieved in other endeavours, Nigerian maternal mortality shows no signs of abatement. Understanding the systemic factors in play requires navigating a complex web of governmental and non-governmental stakeholders. First, access to essential healthcare is gravely impaired in rural areas, where facilities are under-resourced more than in urban centers. These limiting conditions not only hinder a woman's access to appropriate care, often a lifeline for her during pregnancy and childbirth, but also provide a considerable springboard as to how systemic inequalities within the system are sustained (Nwankwo *et al.*, 2022). In a study examining health investment determinants in Nigeria, the authors found that maternal education, access to healthcare, and poverty were key deciding factors in health outcomes, including maternal mortality (Meroyi, 2018). Poverty compounds the barrier not only because of the apparent effect of financial exclusion among many women, who consequently lack the medical care they need, but are pushed into birthing at home, often with callous traditional birth attendants with no medical supervision. Research indicates that lower levels of education are linked to higher maternal mortality rates. Educated women are significantly more likely to effectively access healthcare services and navigate complex health systems, which can be challenging for those who are less informed (Salisu & Hamza, 2024). Health infrastructure is dismal,

characterised by the absence of critical services, such as skilled birth attendance, emergency obstetric care, and basic maternal health supplies, which not only results in high incidences of preventable maternal deaths but should pointer in studying what health systems are required care, educational outreach not be viewed as isolated responses seeking to tackle the crisis. Rather, each intervention is as important as the other, understanding that what each can achieve when used in concert is more effective than working in isolation. Ensuring no woman should be unable to access care should be seen as a non-negotiable, with an understanding that women's health must become a national imperative (Dias *et al.*, 2015; Meroyi, 2018). This can be achieved only by ensuring that all stakeholders and actors explore and identify critical issues in the system, from how maternal education and poverty, for example, have historically stunted progress in these areas.

Role of healthcare infrastructure in maternal health

A good healthcare infrastructure is crucial for cutting down on the high incidences of maternal deaths in Nigeria, whose weak system forms a significant barrier to women's access to medical services during pregnancy and childbirth. The glaring shortcomings in facilities, especially in the rural areas, aside from severely reducing the number of skilled birth attendants (with an annual estimate of over 59,000 deaths resulting from preventable complications, also raise some serious concerns about the apportionment of resources in the sector and whether the sector's policy priority is distinct (Olonade *et al.*, 2019). Aside from exposing women to immediate dangers, the high prevalence of maternal deaths in Nigeria serves as a testimony to the lingering effects of these deaths on bereaved families and the wider community. While there have been some positive developments on the sector's front, such as the increase in the percentage of women accessing antenatal care from 38.2 percent to 42.6 percent in the SDG era (Tolossa, 2024), there remains a wide gap in the access and affordability of healthcare. This is evidenced in the lack of trained human resources for quality healthcare, adequately equipped medical facilities to cope with the high-risk deliveries, lack of government funds for health, and dilapidated hospital structures coupled with poor bed space. In Nigeria, maternal mortality, which is the second highest in the world, exemplifies the calamitous repercussions of defective healthcare facilities where socio-economic inequalities and economic productivity are heightened (Salisu & Hamza, 2024; Olufadewa *et al.*, 2024). Relevantly, tackling these challenges in healthcare delivery does not merely involve an exercise in health equity but is also fundamentally a pivotal strategy to break poverty cycles and provide the bedrock for enhanced educational outcomes in the future. Sound policy programs must, therefore, involve an improved healthcare delivery system, increased government funding for healthcare, and heightened provision of education and resources towards sustainable development (Dias *et al.*, 2015). Maternal deaths can be

averted, and this will go a long way in creating a healthy future for mothers and babies and, indeed, the well-being of the entire community.

Impact of healthcare policies on maternal mortality

Healthcare policy is a key aspect in combating the high figures of maternal mortality that are having a severe cost on Nigeria's economic development. Various policies promoting investment in maternal health services – such as the free Maternal and Child Health Care Programme of the Federal Ministry of Health – are helping to make a difference. However, a closer look at the evidence shows that, due to unstable funding and poor implementation, their proven potential to change maternal outcomes is severely limited (Ogu & Ephraim-Emmanuel, 2018). Inadequate healthcare infrastructure, coupled with the lackluster implementation of healthcare policies and socio-economic barriers, drive the need for informal healthcare systems that lack the training and supervision of standard healthcare practice. This creates an undue risk to the care of expectant mothers. For example, although the Nigerian government has made several commitments to improving maternal health, data from studies show that occurrences of intimate partner violence and low socio-economic status have continued to fuel barriers to accessing quality care (Liadi *et al.*, 2024; Adetutu *et al.*, 2024). This illustrates the need to examine the link between these socio-cultural dynamics and policy efficacy. Consequently, robust healthcare reforms – improved financing, increased training of healthcare personnel, and targeted public awareness initiatives – are good for maternal and foetal outcomes and vital in mitigating maternal mortality, thereby creating a healthier workforce that fuels economic growth in Nigeria. This shows the interplay between health and economic policies.

Maternal Mortality and Economic Development

The link between maternal mortality and economic development outcomes is long-established. This is because of the wealth of literature establishing the impact of health on labor productivity, human capital development, and economic development outcomes generally. Maternal mortality affects labour productivity. Healthier women are more likely to be in the workforce, especially in developing nations where women dominate labor both in the formal and informal sectors. Much research, such as the studies by Okwan and Kovacs (2020), has shown that improved maternal mortality can reduce absenteeism and improve the quality and productivity of the female workforce. The former can lead to better economic outcomes. Maternal health is also crucial for human capital development. The mortality of mothers can have long-lasting negative impacts on families by hampering children's educational attainment and, as a result, weakening the future working-age population. According to the research by Ogunjimi and Adebayo (2019), investment in maternal health can have long-term economic benefits because of the reduction in the cost to families and the improvement

of intergenerational productivity. This argues the case for maternal mortality not only as a health issue but as an economic development strategy.

Theoretical Framework Linking Health to Economic Growth

The theoretical framework that links health to economic growth argues that health improvements, especially maternal health, act as a catalyst for the sustainable economic development of nations. From the perspective of Human Capital Theory, a healthier population leads to a more productive workforce and a more significant contribution to economic output (Bosworth *et al.*, 2021). In particular, when survival also means reducing maternal mortality rates, women emerge fully into the labor market, where they could contribute substantially to aggregate productivity. This is consistent with the Solow Growth Model, according to which a health improvement determines a more efficient use of labour and capital (The Solow Growth Model, 2024), as well as with the Endogenous Growth Theory, according to which the investment in maternal health determines the growth of persons' skills and level of education, thereby adding a 'human capital' contribution to economic growth (Salvatore, 2023). In the empirical literature, we see that the increase in health expenditure determines a reduction in maternal mortality, and through this mechanism, an investment-growth feedback loop is produced; that is, the improvement in economic growth determines the increase in health investments, which in turn determine better results (Raghupathi & Raghupathi, 2020).

This conjecture is additionally supported by the Health-Led Growth Hypothesis: maternal health is fundamental to macroeconomic stabilisation over the long term (Erdogan & Erdogan, 2024). For instance, as maternal deaths are still high in countries such as Nigeria, lowering the deaths not only increases the labor force but also lowers the pressure on the health system, which may free up the resources that can be used in other economic development policies. Evidence shows that better maternal care can lead to increased labour productivity, especially in those sectors where the demand for labour is exceptionally high for women. This, in turn, provides an argument for even more targeted healthcare interventions. The economic impact of maternal mortality thus further illustrates the essential role of health in labour and economic policymaking. The connection between the productivity of female labour and maternal health has medical policy implications (Piabuo & Tieguhong, 2017). Further theoretical frameworks include the Social Determinants of Health and the Demographic Transition Theory, which highlight other pathways by which maternal health impacts broader economic outcomes (Wang, 2013). Social determinants of health, such as poverty and education, directly affect health outcomes and are also proxies for economic outcomes; maternal health is directly linked to improving such social determinants of health, which, for example, leads

to increased labour force participation and can have long-term benefits for the economy (WHO, 2019). The Demographic Transition Theory links falling maternal mortality to demographic change, which, in turn, is linked to economic growth. This growth is often experienced as a period of rapid expansion in a country's economy, known as demographic dividends. These dividends are a direct result of demographic changes, such as the lowering of fertility (Wang, 2013). The Cost of Illness framework shows how the loss of workforce participation and increased healthcare costs contribute to reduced productivity. Together, these theories draw our attention to the long-term importance of investing in maternal health to reap economic stability and growth (Hamal *et al.*, 2020).

Government Policies and Initiatives

Although several international programs like Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) have been launched by United Nations organisations to curtail maternal mortality and sustainably develop health, and Nigeria has benefited from these global partnerships, Nigeria failed to reduce maternal mortality neither in MDGS nor in SDGs. However, this review is proof of the burden of increasing attention to this issue. The MDGs (2000-2015) were eight international development goals that aimed to reduce global poverty. In overview, MDGs aimed at reducing maternal mortality by 75 percent from a baseline in 1990. By the end of 2015, barely half (50%) of the target was achieved in Nigeria (Nwankwo *et al.*, 2022). The failure was due to the financial constraints to build a robust health system badly needed; poor training of healthcare workers that ensured bad clinical skills and low system efficiency; and sometimes essential services to women and children such as antenatal care, delivery, and tertiary care were unavailable even in some villages. SDGs aim to build the future we want, a sustainable and better world for everyone and were launched in 2016. Aimed at reducing maternal mortality to below 70 per 100,000 live births by 2030, its target is more ambitious than MDGS as it encourages member states to ensure that all (everyone) has access to reproductive health services (Olonade *et al.*, 2019). Another reason SDGs encouraged Nigeria may be because it affords her the benefit of 30 years (2016-2030) to improve her systematic structural problems - slow socio-economic development and cultural barriers that hinder natural progression. In all, government policies and initiatives are the bedrock for national development, not only in the health sector but also in general macroeconomic development (Okeowo *et al.*, 2024; Okeowo, 2023).

Socioeconomic Implications

The high maternal mortality rate has severe economic consequences as it worsens inter-generational cycles of poverty and inequality in the country. Maternal mortality

significantly affects the economy because women are primary caregivers and income earners within their households. Among other things, the lack of maternal health services adds to catastrophic health expenditures, which have a negative impact on the household economy as well (Taiwo *et al.*, 2023). Furthermore, culturally induced educational barriers for women have also limited their access to comprehensive maternal health services. The high mortality rates are most likely the result of gender-based violence and restricted access to maternal health services in Nigeria. These issues also contribute to reducing national productivity and lifespan. It is critical for any nation to invest in mothers' health care, which can solve the issue of maternal mortality, which is, in turn, beneficial for long-term socio-economic stability.

According to World Health Organization (WHO) reports, nations that are more concerned about maternal health care can provide better health care to all citizens, eventually saving lives and improving long-term socio-economic stability.

Long-Term Economic Consequences of Maternal Mortality

Beyond individual families, maternal mortality has long-term consequences for national economic stability. Each maternal death represents lost human capital, worsening the odds of productivity and stability by unsettling communities and burdening the developing country with poverty (Ogunjimi & Adebayo, 2019). High death rates among mothers lead to less healthy or educated children, who, in turn, produce less productive workers in the future. It also decreases investment in health care and businesses, slowing economic growth and inventions. In sum, if Nigeria wants to reduce maternal mortality rates, enhancing social outcomes and building a sustainable future for its people are equally important goals.

MATERIALS AND METHODS

The methodology to deploy in empirical analysis depend on the data characteristics (Okeowo, 2023; Okeowo & Awotade, 2024; Okeowo & Japinye, 2025). Having observe the data characteristics, this study evaluates maternal mortality in Nigeria and implications for economic development using time series data and econometric techniques. Maternal mortality rate, health expenses and fertility rates are the exogenous factors, or independent variables. Gross Domestic Product acts as the dependent variable's stand-in. To accomplish this objective, the study incorporates all of these measures. The study uses annual time series data that span 33 observations from 1989 to 2022. Thus, the data's primary sources are the World Health Organization and the World Bank Development Indicators, 2022.

Model Specification

In order to show the relationship between maternal mortality in Nigeria and implications for economic development, this article developed an econometric model.

$$GDP = f(MMR, HEAEXP, FERATE) \dots(1)$$

Where,

GDP-Gross Domestic Product

MMR-Maternal Mortality Rate

HEAEXP- Health Expenditure

FERATE-Fertility Rate

Where all variables are as earlier defined. In the Fully-modified OLS (FOLS) form the model is specified as:

RESULTS AND DISCUSSION

Analysis of Unit Root Test

The unit root test was performed to ascertain the stationarity of the time series data under study to avoid running a spurious regression.

Table 1: Augmented Dickey Fuller Unit Root Test Results

Variables	Level			First Difference			
	T-Stat	Critical Values 5%	P-Values	T-Stat	Critical Values 5%	P-Values	Order of Integration
GDP	1.0131	3.5529	0.9998	4.0878	3.5578	0.0155	I(1)
MMR	2.3463	3.6584	0.3931	3.4448	3.0299	0.0221	I(1)
HEAEXP	2.8941	3.0124	0.0629	5.5107	3.0207	0.0003	I(1)
FERATE	1.7893	2.9604	0.9996	3.2649	3.2152	0.090	I(1)

Source: Author's Computation (2024)

The findings of the augmented dickey fuller unit root test, with a t-statistic of 4.0878, show that the GDP is stationary at first difference because the t-statistic is higher than the 5% threshold values and the probability value is less than 5%, or 0.0155. MMR is not stationary at level since the t-statistics is less than the critical values and the probability values are greater than 0.05, but it is stationary at first difference because the t-statistic of 3.448 is greater than the critical value at 5% of 3.0299 with 0.0221 as the probability values. HEAEXP is stationary at first

difference because the t-statistic of 5.5107 is more than the 5% critical value of 3.0207 with the probability value of 0.0003, but it is not stationary at level because the t-statistic is less than the 5% critical value. However, with a 0.0193 probability value, the FERATE is not stationary at level since the t-statistics are smaller than the critical value of 5%, which is 1.7893 and 2.9604, respectively. But FERATE is stationary at first difference as the t-statistics of 3.2649 is greater than the 10% critical value of 3.2152. however, the probability value is slightly stationary at 5%

The unit roots examine the stationarity of the variables, as was previously discussed, to avoid erroneous findings. The variables are stationary at the first difference of analysis, according to the results, fully-modified Ordinary Least Square FMOLS will be used for econometric analysis.

Cointegration and Bound Test on the Effects of maternal mortality in Nigeria and its implications for economic development

The results of the bound co-integration test verified that there is an equilibrium long-run relationship between the independent variables—Maternal Mortality Rate,

Fertility Rate, Health Expenditure and the dependent variable, Gross Domestic Product, since the F-statistic for the equation is higher than the I(0) and I(1) bounds. An overview of the F-statistic results and approximated boundaries is also given in table 2. The determined F-statistic value of 5.401157, which is based on the data, shows that the dependent variable, sustainable economic development, and other independent factors have a clear co-integration connection. At the 5% significance level, it exceeds the upper and lower bound critical values of 2.37 and 3.2, respectively. As a result of the present of Co-integration, this study shall deploy the use of Fully-modified OLS (FOLS) for analysis.

Table 2: F-Bound Test and Co-integration Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.401157	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's Computation (2024)

There exist a cointegration and long-run relationships between the variables, this justifies the use of Fully Modified Ordinary Least Squares for analysis.

Fully- modified Ordinary Least Squares (FOLS) on the Effects of maternal mortality in Nigeria and its implications for economic development

The fully-modified OLS (FOLS) table below uses maternal mortality rate, fertility rate, and health expenditure as explanatory variables and gross domestic product as the dependent variable. First, there is a significant negative correlation between the dependent variable and the maternal mortality rate (MMR) and fertility rate (FERATE), with respective co-efficients of -11611 and -74667. This indicates that the dependent variable, gross domestic product, falls when the rates of maternal death and fertility rise. Because the p-value of 0.06 slightly (above 0.05) indicates that the maternal mortality rate significantly contributes to the dependent variable, the

t-statistic (1.98593) indicates a moderate relationship with the dependent variable, but it is statistically insignificant at the 5% level. However, the probability value of 0 indicates a statistical relationship that indicates fertility rate is one of the variables that negatively contributed to the dependent variable, and the FERATE t-statistic of -16.2578 has a high value (in absolute terms) that indicates a very strong relationship with the dependent variable.

Furthermore, with a co-efficient of -746671, the health expenditure and the GDP, which acts as a stand-in for the dependent variable, have a negative relationship. This suggests that raising health spending will undoubtedly don't have significant impact on the growth in the GDP. With a probability value of 0.4157, health spending is statistically negligible in relation to the dependent variable. In short, the effect of health spending on GDP, which is used as a stand-in for the dependent variable, is not statistically significant and is negligible in this model.

Table 3: Fully- modified Ordinary Least Squares (FOLS) the Effects of maternal mortality in Nigeria and its implications for economic development

Dependent Variable: GDP				
Method: Fully Modified Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MMR	-1161102	584663.6	-1.98593	0.0645
HEAEXP	-71821.5	85946.03	-0.83566	0.4157
FERATE	-746671	45926.96	-16.2578	0
C	12951308	4176522	3.100979	0.0069
R-squared	0.946168	Mean dependent var		370583
Adjusted R-squared	0.936075	S.D. dependent var		214598.6

S.E. of regression	54257.92	Sum squared resid	4.71E+10
Long-run variance	2.79E+09		

Source: Author's Computation (2024)

Substituted Coefficients

$$GDP = 1295.1161 * MMR - 71821.5 * HEAEXP - 746671 * FERATE$$

The R-Squared is 0.94, the adjusted R-Squared is 0.93,

indicating that 93% of the total variation in the dependent variable is explained by variations in the regressors of the model.

Figure 1 displays the results of the CUSUM Stability

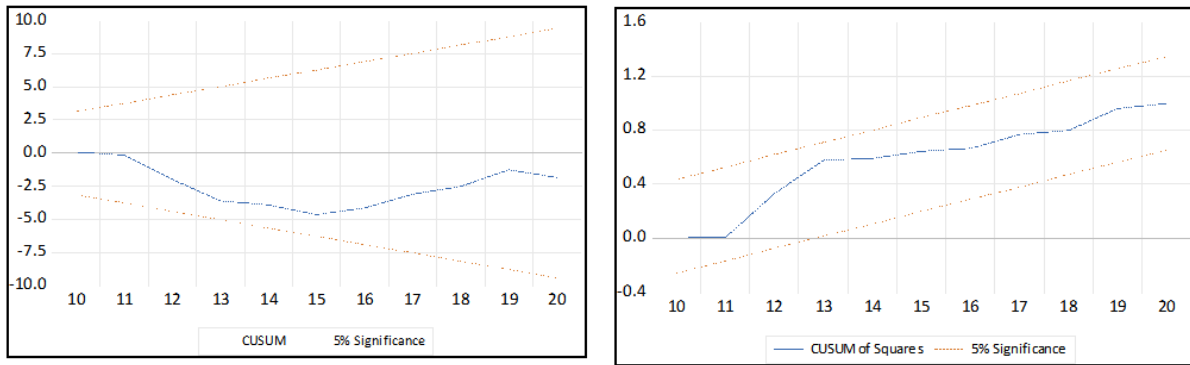


Figure 1: CUSUM Stability Test and CUSUM squared test for Effects of maternal mortality in Nigeria and its implications for economic development

Test and CUSUM squared test on the recursive estimates for effects of maternal mortality in Nigeria and its implications for economic development. The test results show that the CUSUM Stability Test and CUSUM squared test are stable at the same level of significance as the model, even if the model is stable at the CUSUM test level at the 0.05 percent level of significance.

Summary of The Result

The high incidence of maternal deaths in Nigeria, particularly in rural and impoverished areas, is a result of issues with access, quality, and infrastructure of healthcare. A high maternal death rate indirectly limits GDP growth since it has an impact on workforce development, productivity, and population health. The modest significance explained by various confounding variables in GDP that mask the indirect influence of maternal mortality. For instance, the predominance of macroeconomic factors like commerce and oil revenue may mask the true impact of maternal health on GDP. Determining the precise impact on GDP may be challenging due to the limited significance caused by problems with data quality or uneven reporting of maternal mortality. In Nigeria, health investment may not always result in positive effects because of inefficiencies, corruption, or inadequate resource allocation, even though it should theoretically increase productivity and GDP by improving workforce health. The low importance may suggest that a significant amount of health spending is not directly allocated to rural areas or effective programs, restricting its ability to contribute significantly to GDP growth. Furthermore, Nigeria's health spending as a

percentage of GDP is still low by international standards, which could account for its limited impact on GDP growth.

High fertility rates in Nigeria are associated with higher dependence ratios (more dependents per working adult), which might strain resources and result in lower GDP per capita. Savings and investments may decrease due to funds being taken away from lucrative endeavors to meet the needs of a growing population. Moreover, high fertility rates are often linked to poor female labor force participation, which could limit the economy's overall productivity and growth potential. The substantial negative impact can also indicate that Nigeria's economic infrastructure and resources are not keeping pace with the nation's rapid population growth, which would lessen the benefits of GDP per capita.

CONCLUSION

This study examines the impact of maternal mortality on Nigeria's economic development, using maternal mortality rate, fertility rate, and health expenditure as independent variables, with GDP as the dependent variable. Based on the findings, several key recommendations are proposed. First, Nigeria should scale up maternal health programs by improving access to quality prenatal and postnatal care, especially in rural areas. Training medical personnel, enhancing infrastructure, and raising public awareness are essential steps toward reducing maternal deaths and promoting healthier communities, which ultimately support economic productivity.

Second, lowering the fertility rate can reduce the dependency burden and promote female workforce

participation. This can be achieved through widespread reproductive health education and better access to family planning services. Incentives like tax relief or subsidies may also encourage smaller family sizes.

Third, the government should improve the effectiveness and transparency of health spending. Allocating funds directly to health facilities, adopting performance-based budgeting, and encouraging private sector investment through public-private partnerships can strengthen service delivery.

Finally, integrating health and economic policies—by aligning healthcare initiatives with sectors like education and agriculture—can amplify development outcomes. Collectively, these strategies will enhance population health and foster inclusive, long-term economic growth in Nigeria.

REFERENCES

- Adetutu, O. M., Oyinlola, F. F., Oyelakin, T. E., & Ofili, F. L. (2024). Influence of intimate partner violence and male involvement on maternal healthcare services utilisation in Nigeria. *Frontiers in Global Women S Health*, 5. <https://doi.org/10.3389/fgwh.2024.1353117>
- Bosworth, B. P., Kennedy, K., & Baily, M. N. (2021, September 28). *The contribution of human capital to economic growth*. Brookings. <https://www.brookings.edu/articles/the-contribution-of-human-capital-to-economic-growth/>
- Dauda, R. (2023). Maternal mortality in Nigeria: what is known and what needs to be done. In *The NESG Non-Residential Fellowship Programme (NRFPP)*. Retrieved September 8, 2024, from [https://nesgroup.org/download_resource_documents/NRFPP%20Policy%20Brief-%20Prof%20Risikat%20Dauda\(MM\)_1701236063.pdf](https://nesgroup.org/download_resource_documents/NRFPP%20Policy%20Brief-%20Prof%20Risikat%20Dauda(MM)_1701236063.pdf)
- Dias, J. M. G., De Oliveira, A. P. S., Cipolotti, R., Monteiro, B. K. S. M., & De Oliveira Pereira, R. (2015). Maternal mortality. *Revista Médica De Minas Gerais*, 25(2), 173-179. <https://doi.org/10.5935/2238-3182.20150034>
- Erdogan, S., & Erdogan, E. S. (2024). Is the health-led growth hypothesis valid in the Sub-saharan African countries? Fresh evidence from newly developed panel causality tests. *Quality & Quantity*. <https://doi.org/10.1007/s11135-024-01941-7>
- Gao, X., Aderemi, T. A., Zhou, B., Olanipekun, W. D., & Basse, R. (2023). Influence of households' socio-economic factors on maternal and under-five survival in Nigeria: Implication for the sustainable development goal 3. *Gao African Journal of Reproductive Health*, 27(11), 83-90. <https://www.ajrh.info/index.php/ajrh/article/view/4191>
- Hamal, M., Dieleman, M., De Brouwere, V., & De Cock Buning, T. (2020). Social determinants of maternal health: a scoping review of factors influencing maternal mortality and maternal health service use in India. *Public Health Reviews*, 41(1). <https://doi.org/10.1186/s40985-020-00125-6>
- Igboanugo, I. N., & MaryNwাকে, N. (2023). Nutrition, maternal mortality, and quality of life in Nigeria. *American International Journal of Business Management (AIJBM)*, 6(9), 54-64. <https://www.aijbm.com/wp-content/uploads/2023/09/H695464.pdf>
- Jaiswal, A., Carrasco, L. N., & Arrow, J. (2024). Do black women's lives matter? A study of the hidden impact of the barriers to access maternal healthcare for migrant women in South Africa. *Frontiers in Sociology*, 9. <https://doi.org/10.3389/fsoc.2024.983148>
- Lawal, N. A., PhD, Osinusi, K. B., PhD, & Bisiriyu, S. O. (2020). *Maternal mortality, child mortality, life expectancy and economic growth: the Nigerian Experience*. <https://oer.tsuniversity.edu.ng/index.php/jjsms/article/view/35>
- Liadi, O. F., Lawal, M., & Akinrinde, O. (2024). Medicinal Herbs and Biodiversity Resources in Nigeria: An Ethnographic Analysis of their Governance Mechanisms and Implications for Sustainable and Economic Development. *Annals of Spiru Haret University Economic Series*, 23(4). <https://doi.org/10.26458/2348>
- Meroyi, Y. (2018). Determinants of health investment in Nigeria: A case of infant mortality (2000-2014). *International Journal of Academic Research in Business and Social Sciences*, 8(9). <https://doi.org/10.6007/ijarbss/v8-i9/4666>
- Nwankwo, C. E., Nnadi, C. I., Onu, J., & Nwankwo, I. U. (2022). Maternal mortality and economic development in Sub-Saharan Africa. *African Social Science and Humanities Journal*, 3(4), 161-169. <https://doi.org/10.57040/asshj.v3i4.298>
- Odey, F. I., Basse, E. O., & Enya, E. I. (2024). Health Infrastructure and Economic Development Nexus in Nigeria. *International Journal Of Social Sciences And Management Research*, 9(9), 189-205. <https://doi.org/10.56201/ijssmr.v9.no9.2023.pg189.205>
- Ogu, R., & Ephraim-Emmanuel, B. (2018). Nigerian government expenditure, economic productivity and the Prevention of maternal Mortality: A call to action. *Journal of Economics Management and Trade*, 21(1), 1-9. <https://doi.org/10.9734/jemt/2018/39799>
- Ogunjimi, J. A., & Adebayo, A. O. (2019). *Health expenditure, health outcomes and economic growth in Nigeria*. *ideas.repec.org*, 6(2), 106-107. <https://ideas.repec.org/a/aoj/ajeaer/v6y2019i2p130-139id1088.html>
- Okeowo, I. A. (2023). Industrialisation and industrial output nexus in Nigeria: a new empirical evidence. *Journal of Economics and Allied Research*, 8(3), 123-130.
- Okeowo, I. A. and Awotade, J. A. (2024). Money supply, exchange rate and output growth volatility in Nigeria. *Journal of Economics and Allied Research*, 9(2), 27-32
- Okeowo, I. A., Japinye, O. A. (2025). Determinants of output growth volatility in Nigeria. *Sinergi International Journal of Economics*, 3(3), 132-142
- Okeowo, I. A., Oladoke, S. O., Abu, Z., Isaac, O. O. and Adenika, O. A. (2024). Investigation of inflation and wage dynamics in Nigeria: new empirical insights. *Asian Journal of Economics, Business and accounting*, 24(11), 297-306.

- Okeowo, I. A. (2023). Econometric analysis of macroeconomic objective: application of ARCH and GARCH model. *DS Reviews of Commerce and Economics*, 1(1), 1- 8.
- Okwan, F., & Kovacs, P. (2020). *Human Development and Maternal Mortality: Evidence from Sub-Saharan Africa*. ResearchGate. https://www.researchgate.net/publication/341120438_Human_Development_and_Maternal_Mortality_Evidence_from_Sub-Saharan_Africa
- Olonade, O., Olawande, T. I., Alabi, O. J., & Imhonopi, D. (2019). Maternal mortality and maternal health care in Nigeria: Implications for Socio-Economic Development. *Open Access Macedonian Journal of Medical Sciences*, 7(5), 849–855. <https://doi.org/10.3889/oamjms.2019.041>
- Olufadewa, I., Bamidele, D., Olufadewa, T., Adesina, M., & Oladele, R. (2024). Combating recurrent measles outbreaks in Nigeria: Short-term and long-term strategies. *Journal of Medicine Surgery and Public Health*, 3, 100123. <https://doi.org/10.1016/j.glmedi.2024.100123>
- Osemwengie, P. K., & Shaibu, I. (2020). Traditional Pooled data Estimates of the socio-economic determinants of maternal mortality in Sub-Saharan Africa: case study of MDG ERA. *Kampala International University Journal of Social Sciences*, 6(3), 2413-9580.
- Piabuo, S. M., & Tieguhong, J. C. (2017). Health expenditure and economic growth - a review of the literature and an analysis between the economic community for central African states (CEMAC) and selected African countries. *Health Economics Review*, 7(1), 1-12. <https://doi.org/10.1186/s13561-017-0159-1>
- Raghupathi, V., & Raghupathi, W. (2020). Healthcare expenditure and Economic Performance: Insights from the United States data. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.00156>
- Salisu, A. S., & Hamza, Y. (2024). *An empirical assessment of socioeconomic determinants of maternal mortality: evidence from Northeast Nigeria*. <https://samwell-prod.s3.amazonaws.com/essay-resource/b809e64f80-MEJAIMR-2024-VOL3-9.pdf>
- Salvatore, B. (2023, October 10). *Investing in maternal health: economic benefits and policy implications*. <https://www.jcmedu.org/jcmedu-articles/investing-in-maternal-health-economic-benefits-and-policy-implications-102552.html>
- Suparji, S., Nugroho, H. S. W., Sunarto, S., Latif, A., & Prayogi, A. S. (2024). Impact, implications, challenges of accelerating maternal mortality rates in Indonesia. *Deleted Journal*, 1(3), 104–107. <https://doi.org/10.33846/hd10306>
- Taiwo, A. B., Fatunla, O. A., Ogundare, O. E., Oluwayemi, O. I., Babatola, A. O., Ajite, A. B., Ajibola, A. E., Olajuyin, A., Sola-Oniyide, B., & Olatunya, O. S. (2023). Households health care financing methods: social status differences, economic implications and clinical outcomes among patients admitted in a pediatric emergency unit of a tertiary hospital in Southwest Nigeria. *Global Pediatric Health*, 10, 2333794X2311597. <https://doi.org/10.1177/2333794x231159792>
- The Solow growth model. (2024). *Reference library economics*. Retrieved September 8, 2024, from <https://www.tutor2u.net/economics/reference/the-solow-growth-model>
- Van Niel, M. S., Bhatia, R., Riano, N. S., De Faria, L., Catapano-Friedman, L., Ravven, S., Weissman, B., Nzodom, C., Alexander, A., Budde, K., & Mangurian, C. (2020). The impact of paid maternity leave on the mental and physical health of mothers and children: A review of the literature and policy implications. *Harvard Review of Psychiatry*, 28(2), 113–126. <https://doi.org/10.1097/hrp.0000000000000246>
- Vincent, A. A. (2021). The effect of selected socio-economic determinants of health on maternal child health in Nigeria. *International Journal of Multidisciplinary Research and Analysis*, 04(1). <https://doi.org/10.47191/ijmra/v4-i1-01>
- Wang, G. (2013). The impact of social and economic indicators on maternal and child health. *Social Indicators Research*, 116(3), 935–957. <https://doi.org/10.1007/s11205-013-0330-y>
- World Health Organization (2019). *Social determinants of health*. https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1