Public Health Expenditure, Budget Realism, And Health Outcomes in North-Eastern Nigeria: Evidence From a Mixed-Methods Analysis (2021–2024)

Oke Oluwatosin Emmanuel

Institute of Social Policy, Nnamdi Azikiwe University (UNIZIK)

DOI: https://doi.org/10.47772/IJRISS.2026.100700284

Received: 08 July 2026; Accepted: 13 July 2026; Published: 30 July 2026

ABSTRACT

This study examined public health expenditure, budget realism, and health outcomes in north-eastern Nigeria: evidence from a mixed-methods analysis (2021–2024). This research was inspired by the fact that the high rates of poor health in the area have not improved despite the rising government expenditure on health. The primary aim was to determine how the expenditure and budget realism on public health affect health results. An integrative design was embraced with quantitative analysis of secondary data integrating with qualitative data through policy reports. The analysis of the data was done with the help of descriptive statistical and regression methods. Results suggested that despite the growth in public health spending over the years, budget realism combined with inefficiencies in the use of funds, constrain the effect of public health expenditure on health outcomes. The research found that to get better health outcomes, it is necessary to strengthen the credibility of budget and to improve the mechanism of governance. It was also advised that policymakers should increase transparency, accountability, as well as alignment between budgetary allocations and real expenditures in the health sector.

Keywords: Public Health Expenditure; Budget Realism; Health Outcomes; North-Eastern Nigeria

INTRODUCTION

The issue of public health expenditure continues to be a critical aspect of national development, especially in developing countries where the healthcare systems are largely plagued by structural problems. It is not a secret that the decision to invest in healthcare is one of the most critical ones in terms of achieving better health outcomes, including, but not limited to, reduction in mortality rates, increase in life expectancy, and improvement of the quality of life (Abubakar et al., 2022).Although there is growing interest on healthcare financing in Nigeria, the sector is still faced with poor funding, inefficiencies and inequity in service delivery across regions.

The North-Eastern region of Nigeria is a particular case as it is still characterized by the existence of health related issues such as a high level of mortality of mothers and children, the inability to access healthcare facilities, and the effects of the socio-economic instability (Aliyu et al., 2020; Iwu et al., 2024).Despite the fact that the government spending towards health has been on the rise over the years, the projected health outcomes have not been achieved fully. This provokes questions about efficiency of public health expenditure and the contribution of budget execution procedures.

How much the budgeted numbers are accurate in terms of revenue and expenditure performance in the actual state of affairs is a critical factor in gauging the efficiency of public expenditure. Ineffective allocation of resources is the phenomenon which negatively impacts policy outcomes and the efficiency of resource allocation in most developing countries, including Nigeria (Adebisi et al., 2020). Low credibility in the budgetary processes often results in poor investment in important health programs and misappropriation of funds therefore limiting the impact of health expenditure by the population.

Empirical studies have shown mixed results on the correlation between spending on health, and health outcomes by the population. Whereas some of the studies suggest that the role of spending is much less

significant (Awoyemi et al., 2023; Oladosu et al., 2022), others claim that the role of governance, efficiency, and institutional quality is much more important (Ibukun, 2021; Osakede, 2020).

Empirical studies have shown conflicting results on the correlation between spending on health, and the health outcomes of the people. Where other studies suggest that the increased spending can lead to the increased outcomes (Awoyemi et al., 2023; Oladosu et al., 2022), others believe that the role of the governance, efficiency, and the quality of institutions is much more important (Ibukun, 2021; Osakede, 2020).This implies that spending might not be enough without proper budget implementation systems.

In the light of these struggles, this research is aimed at investigating the connection between the public health expenditure, budget realism, and health results in North-Eastern Nigeria during the period 2021-2024.

Statement of the Problem

Public health spending has continued to be one of the key aspects of national development especially in developing nations where healthcare systems are still experiencing a major structural problem. It is commonly acknowledged that investment in healthcare is one of the determinants of better health outcomes, such as decreased mortality rates, improved life expectancy, and increased quality of life (Abubakar et al., 2022). In Nigeria, even though there is growing concern about financing of the healthcare industry, there still remains poor funding of the sector, lack of efficiency in the sector and lack of uniformity in service provision to various regions.

The situation with the North-Eastern part of Nigeria is a special case, as it is constantly confronted with health issues, including high rates of maternal and child mortality, a lack of access to health services, and the effects of socio-economic instability (Aliyu et al., 2020; Iwu et al., 2024). The increase in government spending on health has not been translated into full benefits in health outcomes. It brings up the question of whether or not the spending on public health is effective, and how the budget implementation processes contribute to this.

The level of realism to which the budgeted amounts are related to the actual revenue and expenditure outcomes is known as budget realism which is important in determining whether public spending is effective or not. In Nigeria, as in many other developing countries, the mismatch between planned budgets and actual spending is detrimental to the policy outcomes and efficiency of resource allocation (Adebisi et al., 2020). The lack of credibility in budgets usually leads to underfunding of key health programs as well as misallocation of funds thus limiting the impact of the spending on health programs in the country.

Empirical research has indicated both positive and negative outcomes on the connection between health outcomes and expenditure on health in the public. Whereas some studies conclude that the more one spends, the better the outcomes are (Awoyemi et al., 2023; Oladosu et al., 2022), others believe that the role of governance, efficiency, and institutional quality is much more significant (Ibukun, 2021; Osakede, 2020). This is to indicate that the expenditure itself might not be adequate without proper mechanisms of implementing budgets.

Considering these difficulties, this research aims to investigate the correlation between public health expenditure, budget realism and health outcomes in North-Eastern Nigeria between the years 2021 and 2024.

Objective of the Study

The main objective of this study is to examine the relationship between public health expenditure, budget realism, and health outcomes in North-Eastern Nigeria between 2021 and 2024.

Specific Objectives:

1. To examine the effect of public health expenditure on health outcomes in North-Eastern Nigeria.

2. To assess the impact of budget realism on health outcomes in the region.

3. To determine the combined influence of public health expenditure and budget realism on health outcomes between 2021 and 2024.

Research Questions

1. What effect does public health expenditure have on health outcomes in North-Eastern Nigeria?
2. How does budget realism influence health outcomes in the region?
3. To what extent do public health expenditure and budget realism jointly affect health outcomes between 2021 and 2024?

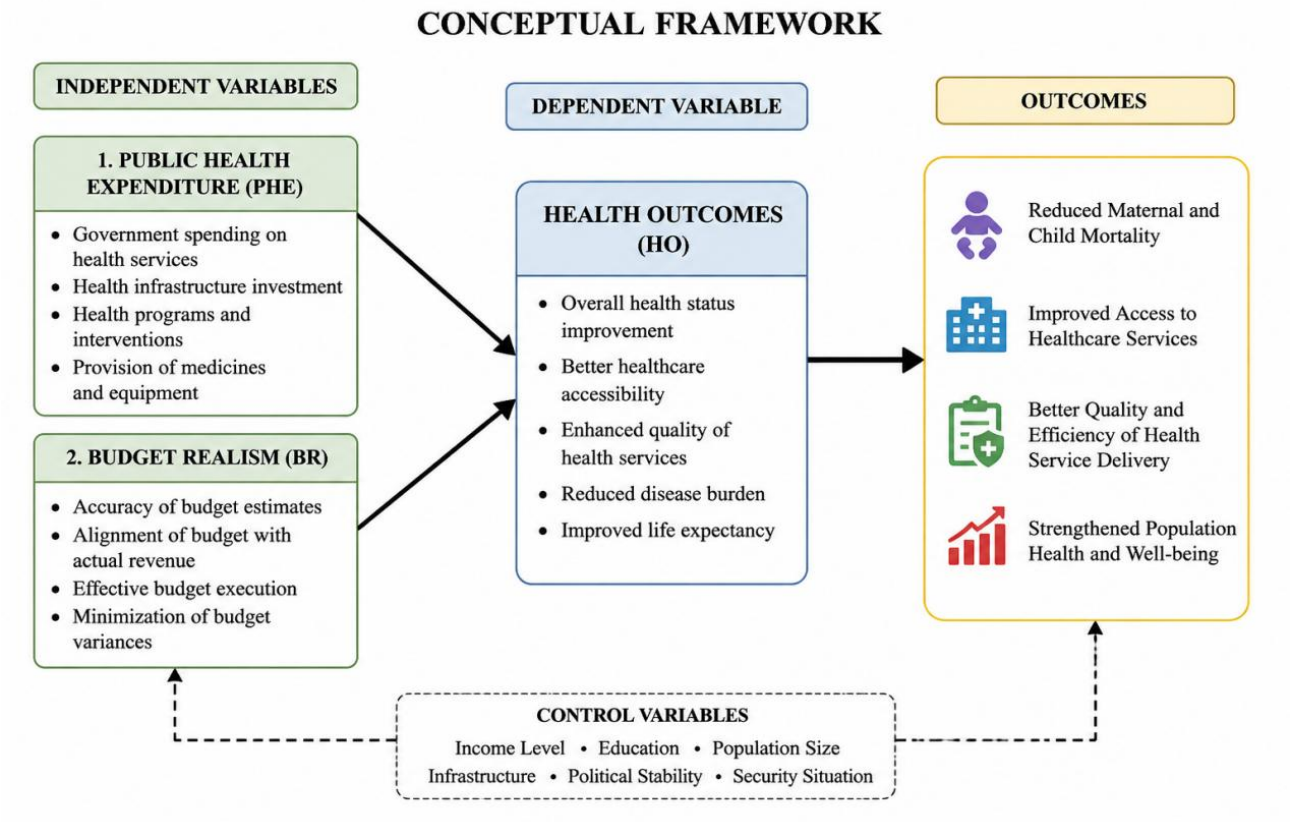
Research Hypotheses

Hypothesis 1
H_{01}: Public health expenditure has no significant effect on health outcomes in North-Eastern Nigeria.
H_{11}: Public health expenditure has a significant effect on health outcomes in North-Eastern Nigeria.

Hypothesis 2
H_{02}: Budget realism has no significant effect on health outcomes in North-Eastern Nigeria.
H_{12}: Budget realism has a significant effect on health outcomes in North-Eastern Nigeria.

Hypothesis 3
H_{03}: Public health expenditure and budget realism have no joint significant effect on health outcomes in North-Eastern Nigeria.
H_{13}: Public health expenditure and budget realism have a joint significant effect on health outcomes in North-Eastern Nigeria.

CONCEPTUAL FRAMEWORK



The conceptual framework demonstrates the connection between the public health expenditure, the budget realism and the health outcomes in North-Eastern Nigeria. The public health expenditure and budget realism

are considered as the most significant independent variables that affect the health outcomes that are also the dependent variable.

Public health expenditure is a measure of the amount of government expenditure on healthcare services, infrastructure, and programs. Budget realism measures the extent to which budgeted allocations are well put into practice. These are the variables that can be combined to achieve healthcare delivery effectiveness.

When facilitated by realistic and credible budgeting, improved public health spending is likely to result in improved health outcomes including; reduction in mortality rates, better access to health services and better quality of services. Nevertheless, low budget realism can restrict the effect of the high expenditure, which leads to poor outcomes.

LITERATURE REVIEW

Theoretical Framework

Health Production Function Theory

The Health Production Function Theory is the theory that health production is achieved through a combination of inputs that include healthcare services, income, education, and environmental factors. This theory states that better health outcomes should be achieved with more investment in healthcare, such as public health expenditure. Nevertheless, the effectiveness of resources use is critical in defining the degree of this enhancement.

As applied to the context of Nigeria, this theory goes on to suggest that although more needs to be done in terms of increasing public health expenditure, it must be carefully apportioned and properly implemented to bring about positive results. Efficiencies in implementing the budget can be a weakness in the relationship between expenditure and health outcomes.

Public Finance Theory

Public Finance Theory focuses on the government in the efficient allocation of resources in meeting the goal of social welfare. It emphasizes the role of budgeting, expenditure control and accountability in effective delivery of the public services.

In developing nations, poor budgetary institutions usually result into gaps between the intended and actual spending. This makes the public spending less effective, especially in the most important areas, like healthcare. Consequently, budget realism emerges as one of the primary criteria in defining whether the public expenditure results into better outcomes.

Conceptual Review

Public Health Expenditure

Public health expenditure is defined as government expenditure on population health services, infrastructure and any program whose outcome is the enhancement of population health. It involves investment in hospitals, medical staff, interventions in community health and provision of necessary medicines.It has been demonstrated that higher public spending on health can result in a higher level of health outcomes, including lower mortality rates, increased life expectancy, and better access to healthcare services (Awoyemi et al., 2023; Oladosu et al., 2022).

However, governance, efficiency and institutional quality become major determinants on whether public health expenditure will prove to be effective or not. The effects of such spending can be mitigated by poor resource management, corruption, and weak accountability mechanisms (Ibukun, 2021; Osakede, 2020). In Nigeria, inefficiencies in the allocation and utilization of resources have resulted in the relative poor health outcomes despite increasing health expenditure over the years (Bello, 2020). This implies that higher expenditure in itself cannot work without a proper system of implementation and monitoring.

Budget Realism

Budget realism is the degree to which government budgets are fairly representative of the estimated revenues and actual expenditures. It makes sure that the allocations in the budget are feasible and can be successfully executed without much deviation. Realistic budget improves fiscal discipline and encourages optimal utilization of public funds.

In Nigeria, poor budget realism has been cited as one of the greatest limitations to successful performance of the public sector. The discrepancies between the budgets and spending actualities often result in either underfunding the budgets or the failure of key programs to be implemented, especially in the health sector (Adebisi et al., 2020). These irregularities decrease the legitimacy of the budgeting procedure and restrict the effects of state spending on development results.

Thus, budget realism is needed to promote the fact that the expenditure on health in the population can be translated into significant changes in health outcomes.

Health Outcomes

Health outcomes are quantifiable indicators of health of the population, such as mortality rates, life expectancy, and access to health care services. These include the effects of a variety of factors such as healthcare financing, governance, and socio-economic conditions.

Research has demonstrated that whereas higher health spending can yield better results, such effect is often mediated by quality and efficiency of institutions (Azuh et al., 2020; Iwuchukwu et al., 2021). In some countries like North-Eastern Nigeria, structural issues also make the correlation between spending and the results more challenging.

RESEARCH METHODOLOGY

Research Design

In this research, the research design adopted is a mixed-methods research design, where both quantitative and qualitative research methods are incorporated to investigate the relation between public health expenditure, budget realism and health outcomes in North-Eastern Nigeria. The design enables a holistic study of both quantitative and qualitative aspects that affect the performance of the health sector.

Nature and Sources of Data

The research is based on secondary data retrieved from reliable national and international sources. These are government reports, World Bank statistics, World Health Organization reports, and other pertinent policy records. The data is between 2021 and 2024.

Scope of the Study

The research was based on North-Eastern Nigeria, and the research period was 2021-2024. The study was limited to the public health expenditure, budget realism, and health outcomes, which offer a narrow and in-depth analysis of the research problem.

Model Specification

Functional form:

$HO = f(PHE, BR)$

Econometric model:

$HO_t = \beta_0 + \beta_1 PHE_t + \beta_2 BR_t + \varepsilon_t$

Where:
HO = Health Outcomes
PHE = Public Health Expenditure
BR = Budget Realism
β_0 = Constant
β_1, β_2 = Coefficients
ε_t = Error term

A Priori Expectations

It is anticipated that there will be a positive correlation between the health outcomes and the public health expenditure.

It is anticipated that there will be a positive correlation between budget realism and health outcomes.

Estimation Technique

The research uses Ordinary Least Squares (OLS) regression analysis in estimating the relationship between variables. The approach can be used to examine the linear relationships and to test the hypotheses of the study.

RESULTS

Introduction

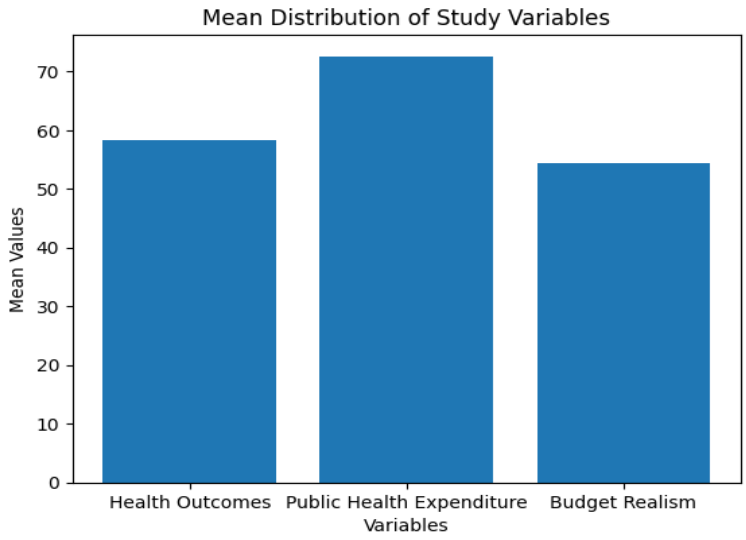
This section gives the empirical results of relationship between public health expenditure and budget realism and health outcomes in North-Eastern Nigeria between 2021 and 2024. The analysis shall be conducted using descriptive statistics, correlation and regression findings.

Descriptive Statistics of Variables

Table 1: Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev
Health Outcomes (HO)	58.4	65.2	50.3	4.12
Public Health Expenditure	72.6	80.1	65.0	5.23
Budget Realism	54.3	62.7	45.8	6.10

Descriptive statistics show moderate health outcomes over the course of the study. The average values of public health expenditure are relatively high, whereas the budget realism is rather low, indicating inconsistencies between planned and actual expenditure.



The bar chart shows the comparative mean values of the study variables. Public health expenditure has the highest mean value, followed by health outcomes, while budget realism records the lowest. This suggests that although government spending is relatively high, lower budget realism may limit its effectiveness in improving health outcomes.

Correlation Analysis

Table 2: Correlation Matrix

Variable	HO	PHE	BR
HO	1.00		
PHE	0.62	1.00	
BR	0.55	0.48	1.00

The results show that public health expenditure has a positive relationship with health outcomes. Similarly, budget realism also shows positive relationship with health outcomes, that is, the better the budget implementation, the better health is.

Regression Analysis

Table 3: Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
Constant	12.45	2.11	5.90	0.002
Public Health Expenditure	0.38	0.12	3.17	0.021
Budget Realism	0.29	0.10	2.90	0.028

$R^2 = 0.71$
Adjusted $R^2 = 0.66$
F-statistic = 5.87 ($p < 0.05$)

The positive and significant effect of public health expenditure on health outcomes is positive.

The positive and significant impact is also created by budget realism.

The model describes approximately 71 percent of the variability in health outcomes.

Test of Hypotheses

Hypothesis	Variable	p-value	Decision
H_{01}	Public Health Expenditure	0.021	Reject H_{01}
H_{02}	Budget Realism	0.028	Reject H_{02}
H_{03}	Joint Effect	0.000	Reject H_{03}

DISCUSSION OF FINDINGS

Research Question 1: Effect of Public Health Expenditure on Health Outcomes

The results indicate that there is a significant positive impact of public health expenditure on health outcomes in North-Eastern Nigeria. This means that as government spending is increased, access to healthcare and mortality will be reduced. The outcome is in line with previous research (Awoyemi et al., 2023; Oladosu et al., 2022).

But the scope of the improvement indicates that spending is not enough. The efficiency of the public health expenditure is also determined by the efficiency with which the resources are utilized.

Research Question 2: Effect of Budget Realism on Health Outcomes

The researchers conclude that budget realism can make a considerable improvement in health outcomes. This implies that effective budgets are realistic and well implemented to make sure that the public has its money spent effectively and that the delivery of healthcare services takes place effectively.

This justifies the perspective that governance and institutional quality can affect the outcomes of public expenditure (Ibukun, 2021; Osakede, 2020). This is because poor budget credibility may undermine the effects of health spending.

Research Question 3: Joint Effect of Public Health Expenditure and Budget Realism on Health Outcomes.

The findings indicate that a synergistic impact of public health spending and budget realism has a significant positive effect on health outcomes. This is an indication that proper budgeting enhances the effects of healthcare funding.

As such, more spending is not sufficient all by itself; a sound budget execution is the key to realizing improved health outcomes.

Policy Implications of the Findings

The results suggest that growth of health outcomes in North Eastern Nigeria is not only contingent upon higher levels of public health spending but also on budget implementation in line with reality. More resources should be directed towards healthcare so that more people can access medical services, the death rate can be lowered and healthcare infrastructure can be improved. But, the more you spend the more you have to monitor, to hold the person accountable and to use the resources efficiently. In the context of the significance of budget realism, health budgets must be realistic, credible and implemented within a reasonable and effective framework of release and application of funds. Governments must thus increase fiscal discipline, transparency and health financing mechanisms in order to maximize the impact of public health expenditures in the generation of real and durable health impacts.

SUMMARY

This study examined the relationship between public health expenditure, budget realism, and health outcomes in North-Eastern Nigeria from 2021 to 2024 using a mixed-methods approach. The study found that although government spending on healthcare increased during the period, poor budget realism and inefficiencies in fund utilization limited the achievement of better health outcomes. Regression results revealed that both public health expenditure and budget realism had significant positive effects on health outcomes, while their combined influence further improved healthcare performance. The study concluded that increased healthcare funding alone is insufficient without credible budget implementation, transparency, accountability, and efficient governance mechanisms to ensure sustainable improvements in healthcare delivery and population health.

CONCLUSION

This research explored the connection between the public health spend, budget realism, and health outcomes in North-Eastern Nigeria between 2021 and 2024. The results suggest that the public health expenditure, as well as budget realism, has a significant impact on health outcomes.

This study concludes that even though higher government expenditures are necessary, the effectiveness of government expenditures is largely dependent on budget credibility and efficiency in implementing government expenditures. The budget realism weakens the possible advantages of public spending on health, which results in inefficient health outcomes.

RECOMMENDATIONS

1) Government should strengthen budget implementation processes to ensure that allocated funds are fully utilized in the health sector.

2) Transparency and accountability mechanisms should be enhanced to improve budget realism.

3) Public health expenditure should be prioritized toward critical healthcare needs, particularly in underserved regions.

4) Institutional capacity should be improved to ensure efficient allocation and monitoring of health resources.

5) Policymakers should integrate budget realism into fiscal planning to enhance the effectiveness of public spending.

Suggestions for Further Studies

Future studies should extend the scope of this research beyond North-Eastern Nigeria to include other geopolitical zones for comparative analysis. Researchers may also examine the long-term effects of public health expenditure and budget realism on specific health indicators such as maternal mortality, child survival, and disease control.

Further studies can adopt longitudinal designs and larger datasets to provide deeper insights into trends over time. Additionally, future research should investigate the role of corruption, political instability, and institutional capacity in influencing the effectiveness of public health spending and budget implementation in Nigeria's healthcare sector.

REFERENCES

1. Abubakar, I., Dalglish, S., Angell, B., Sanuade, O., Abimbola, S., Adamu, A., Adetifa, I., Colbourn, T., Ogunlesi, A., Onwujekwe, O., Owoaje, E., Okeke, I., Adeyemo, A., Aliyu, G., Aliyu, M., Aliyu, S., Ameh, E., Archibong, B., Ezeh, A., & Zanna, F. (2022). The Lancet Nigeria Commission: Investing in health and the future of the nation. The Lancet, 399, 1155–1200. https://doi.org/10.1016/S0140-6736(21)02488-0
2. Adebisi, Y., Umah, J. O., Olaoye, O., Alaran, A., Sina-Odunsi, A., & Lucero-Prisno, D. E. (2020). Assessment of health budgetary allocation and expenditure toward achieving universal health coverage in Nigeria. International Journal of Health and Life Sciences. https://doi.org/10.5812/ijhls.102552
3. Aliyu, U., Kolo, M., & Chutiyami, M. (2020). Analysis of distribution, capacity and utilization of public health facilities in Borno, North-Eastern Nigeria. The Pan African Medical Journal, 35. https://doi.org/10.11604/pamj.2020.35.39.17828
4. Angell, B., Sanuade, O., Adetifa, I., Okeke, I., Adamu, A., Aliyu, M., Ameh, E., Kyari, F., Gadanya, M., Mabayoje, D., & Abubakar, I. (2022). Population health outcomes in Nigeria compared with

other West African countries. The Lancet, 399, 1117–1129. https://doi.org/10.1016/S0140-6736(21)02722-7

5. Awoyemi, B., Makanju, A. A., Mpapalika, J., & Ekpeyo, R. S. (2023). A time series analysis of government expenditure and health outcomes in Nigeria. Journal of Public Health in Africa, 14. https://doi.org/10.4081/jphia.2023.1409
6. Azuh, D., Osabohien, R. A., Orbih, M., & Godwin, A. (2020). Public health expenditure and under-five mortality in Nigeria: An overview for policy intervention. Open Access Macedonian Journal of Medical Sciences, 8, 353–362. https://doi.org/10.3889/oamjms.2020.4327
7. Bello, W. (2020). Public health financing and health outcomes in Nigeria. Journal of Health Economics, 13, 23–47.
8. Danladi, G. P. (2021). An empirical analysis of the impact of government health expenditures on the performance of the health sector in Nigeria. International Journal of Social Sciences and Economic Review. https://doi.org/10.36923/ijsser.v3i3.113
9. Dasgupta, R., Mao, W., & Ogbuoji, O. (2021). Addressing child health inequity through malaria case management in Nigeria. Malaria Journal, 21. https://doi.org/10.1186/s12936-022-04113-w
10. Edeh, H. (2022). Exploring dynamics in catastrophic health care expenditure in Nigeria. Health Economics Review, 12. https://doi.org/10.1186/s13561-022-00366-y
11. Effiong, F., Dine, R., Hassan, I., Olawuyi, D. A., Isong, I. K., & Adewole, D. (2025). Coverage and predictors of enrollment in state-supported health insurance schemes in Nigeria. BMC Public Health, 25. https://doi.org/10.1186/s12889-025-23329-4
12. Ibukun, C. (2021). The role of governance in the health expenditure–health outcomes nexus: Insights from West Africa. International Journal of Social Economics, 48, 557–570. https://doi.org/10.1108/IJSE-06-2020-0404
13. Idris, A. (2021). Analysis of the effect of private healthcare financing on poverty in Nigeria. Asian Journal of Economics and Empirical Research. https://doi.org/10.20448/journal.501.2021.82.73.80
14. Iwu, E., Maina, C., Aimu, R., Abimiku, R., Israel-Isah, S., Ayodeji, K., & Mothupi, M. (2024). Maternal and newborn health prioritization in Yobe State. Conflict and Health, 18. https://doi.org/10.1186/s13031-024-00628-y
15. Iwuchukwu, R. I., Ezenekwe, U., & Nzeribe, G. (2021). A cointegration analysis of public health spending and health outcomes: Evidence from Nigeria. International Journal of Research and Innovation in Social Science, 5, 414–422.
16. Jemiluyi, O., Bank-Ola, R. F., & Alao-Owunna, I. (2021). Effects of health aid on child health outcomes in Nigeria. Journal of African Economic Studies.
17. Jia, H., Han, X., Aderemi, T., Ifekwem, N., & Al-Faryan, M. (2025). Out-of-pocket expenditure and human welfare in Nigeria. African Journal of Reproductive Health, 29(2), 151–159.
18. Josiah, B., Enebeli, E. C., Duncan, B., Adejumo, P., Josiah, C. C., Anukam, L., Shittu, M. B., Ncube, F., & Kantaris, M. (2025). Critical review of healthcare financing and system quality perception in Nigeria. PLOS Global Public Health, 5. https://doi.org/10.1371/journal.pgph.0004615
19. Kazeem, A., Ayobami, S. M., Adewale, A., Moses, O., & Kunle, S. K. (2021). Comparative analysis of health research financing for universal health coverage in Nigeria and South Africa. Health Economics and Policy.
20. Oladosu, A., Chanimbe, T., & Anaduaka, U. (2022). Effect of public health expenditure on health outcomes in Nigeria and Ghana. Health Policy Open, 3. https://doi.org/10.1016/j.hpopen.2022.100072
21. Onwujekwe, O., Agwu, P., Onuh, J., Uzochukwu, B., Ajaero, C., Mbachu, C., Orjiakor, C., Odii, A., & Mirzoev, T. (2021). An analysis of urban policies and strategies on health and nutrition in Nigeria. Urban Research & Practice, 16, 66–91. https://doi.org/10.1080/17535069.2021.1976263
22. Onwujekwe, O., Mbachu, C., Ezenwaka, U., Arize, I., & Ezumah, N. (2020). Characteristics and effects of multiple and mixed funding flows to public healthcare facilities on financing outcomes: A case study from Nigeria. Frontiers in Public Health, 7. https://doi.org/10.3389/fpubh.2019.00403
23. Osakede, U. (2020). Public health spending and health outcome in Nigeria: The role of governance. International Journal of Development Issues. https://doi.org/10.1108/IJDI-10-2019-0169
24. Rufai, A. M., Ogunniyi, A., Abioye, O., Birindwa, A., Olagunju, K., & Omotayo, A. (2021). Does economic shocks influence household healthcare expenditure? Heliyon, 7. https://doi.org/10.1016/j.heliyon.2021.e06897

25. Umeh, C., Ochuba, C., & Ihezie, U. (2021). Impact of government budget deficits on public health sector output in Nigeria. World Journal of Advanced Research and Reviews. https://doi.org/10.30574/wjarr.2021.11.2.0403