Journal of Economics and Allied Research Vol. 10, Issue 3, pp. 256-267 (September, 2025) Print ISSN: 2536-7447 and E-ISSN: 3043-6591

IMPACT OF PUBLIC EXPENDITURE ON THE AVAILABILITY OF MEDICAL EQUIPMENT AND HEALTH SERVICES DELIVERY IN PRIMARY HEALTHCARE CENTERS OF BORNO STATE, NIGERIA

ABUBAKAR ORLANDO IJOKO
Department of Economics, Nigerian Army University Biu (NAUB)
Biu, Borno State, Nigeria.
Email: abubakar.ijoko@naub.edu.ng; +2348038118716

HASSAN MOHAMMED
Department of Economics, Nigerian Army University Biu (NAUB)
Biu, Borno State, Nigeria.
Email: hassan.mohammed@naub.edu.ng; +2347039633339

SAMEERA HARUNA
Department of Economics, Nigerian Army University Biu (NAUB)
Biu, Borno State, Nigeria.
Email: sameerah.haruna@naub.edu.ng; +2347033363644

IBRAHIM ZAKARI
Faculty of Social Sciences. Nigerian Army University Biu (NAUB)
Biu, Borno State, Nigeria.
Email: ibrahim.zakari@naub.edu.ng; +2347037700077

ABSTRACT
The study investigates the impact of public expenditure on the availability of medical equipment and health services delivery in primary healthcare centers (PHCs) of Borno State, Nigeria. The cross-sectional research design was employed for the analysis using data gathered from primary sources using questionnaire. Due to the categorical nature of the variables, the study employed Survey Linear Ordinary Least Squares method of analysis. The study reveals that public capital expenditure has statistical impact on medical equipment availability in PHCs of Borno State which by extention results in health services delivery. The study recommends prioritisation of capital health spending to improve healthcare service delivery in Borno state, Nigeria.
Keywords: Public Health Expenditure, Basic Healthcare Provision Fund, Primary Healthcare
JELCodes: H51, I18, I19
Acknowledgements: This project was sponsored by Tertiary Education Trust Fund (TETFund)

1. INTRODUCTION
The Nigerian government under successive administrations have made frantic efforts aim at improving healthcare funding through various policies such as; Dug revolving fund (DRF), National Health Act (2014) and Basic Healthcare Provision Fund (BHCPF) among others. All these is to ensure steady flow of funds to the three tiers of health sector (Primary, Secondary and Tertiary) in Nigeria. The state governments that are responsible for the primary healthcare centres (PHCs) are not left out of the health policy reforms, for instance; the Borno State Government embarked on a strategic health development plan in 2015 with the goal of repositioning the health

centers in the state towards effective healthcare delivery to its residents. Despite these efforts, Borno State Primary Healthcare Centers (PHCs) receive insufficient allocations needed to address critical gaps in health infrastructure such as medical equipment supply (World Health Organization [WHO, 2020]). The delivery of quality healthcare services is a fundamental pillar of sustainable development and social welfare, being the reason, it came 3rd in the global sustainable goals (Ibrahim & Rejoice, 2022; Inuwa & Ijoko, 2025). In addition, an increase in human capital stock resulting from improved government health spending has the potential to transform a state socially, politically and economically (Ijoko, 2023). In realisation of the important role of health in nation's building, governments across the globe allocate significant public funds toward healthcare systems, aiming to enhance service delivery, improve infrastructure and ensure adequate medical equipment.

However, public expenditure on health can be categorised into capital and recurrent expenditures. The health capital expenditure is spending on the purchase of medical equipment and health infrastructures, whereas recurrent expenditures are funds used for the day-to-day activities within the healthcare centres. This may include; training, salaries and wages as well as drug purchase (Martin *et al*., 2025). The effectiveness of these expenditures for improving the healthcare service delivery, particularly in states remains a critical area of empirical investigation. The organisation overseeing and monitoring global health performance (WHO) recommends that countries allocate at least 5% of their Gross Domestic Product (GDP) to healthcare for the universal health coverage. However, Nigeria's health expenditure has consistently remained below this benchmark, with total government health spending averaging only 0.6% of GDP (World Bank, 2022). This under-investment has significantly affected the quality and accessibility of healthcare services, particularly in conflict-affected regions like Borno State.

Borno State is located in northeastern Nigeria, where significant healthcare challenges remain a burden to the people due to years of insurgency, poverty and inadequate infrastructure (United Nations Development Programme [UNDP], 2022). Primary Healthcare Centres (PHCs) serve as foundation of the healthcare system, thereby providing essential medical services to rural and under-served communities. However, the effectiveness of PHCs is often constrained by insufficient funding, inadequate medical equipment needed to deliver effective healthcare services for rural households in Borno state, Nigeria (National Primary Health Care Development Agency [NPHCDA], 2020).

This study focuses on investigating the impact of public capital and recurrent spending on medical equipment availability and functionality such as Xray, thermometer, incubator, stethoscope, sphygmomanometer, weighing scale, refrigerator, sterilisation in PHCs within Borno state, Nigeria. The area for this study is a rare gem and often neglected by most scholars concerning the public spendings on health matters, is what makes the present study unique on its stand. First, the dilapidation of health infrastructure in Borno's PHCs evidenced by non-functional medical equipment, this has been linked to systemic under-investment in capital projects (Ijoko *et al*., 2022). Capital expenditure is critical for constructing and rehabilitating facilities, yet its impact on service delivery remain understudied in conflict setting like Borno state. Similarly, medical equipment shortages, such as the absence of basic diagnostic tools, hinder PHCs' capacity to manage emergencies and severe health conditions (WHO, 2022). Secondly, recurrent expenditure, which funds personnel training and drug availability, directly influences service quality. For instance, only 30% of Borno PHC's staff reportedly receive annual training, contributing to low retention rates and skill gaps (Federal Ministry of Health, 2020).

Capital expenditure plays a crucial role in the development of healthcare infrastructure, including the construction and renovation of PHCs. Studies (Ijoko *et a*l., 2022; Orji *et a*l., 2021; Awoyemi *et al*., 2023) suggest that well-equipped health facilities significantly enhance service delivery, patient satisfaction and overall healthcare outcomes. However, in conflict-affected regions like Borno State, infrastructure development has been hindered by insecurity and resource constraints. Analysing the extent to which public capital expenditure contributes to improving medical equipment in PHCs is vital for assessing the effectiveness of government investments. More importantly, medical equipment is fundamental to diagnosing and treating illnesses in PHCs. Public capital expenditure is expected to improve the availability of modern diagnostic tools, laboratory equipment and emergency medical supplies (Akinyemi *et al*., 2020). However, reports indicates that many PHC's in Borno State lack adequate medical equipment, leading to poor service delivery (Federal Ministry of Health [FMOH], 2021). Investigating the relationship between public capital investment and medical equipment availability in PHCs will provide insights into the efficiency of government spending in this area.

Existing studies emphasise aggregate health spending but rarely dissect how capital versus recurrent allocations deferentially affect PHC outcomes (Oladosu *et al*., 2022). For example, while national policies prioritise infrastructure development, recurrent costs like staff training and drug supplies are often prioritised, creating imbalances that undermine PHC resilience (NHA, 2021). In Borno, where 40% of PHCs lack functional equipment and 60% report frequent drug shortages, understanding the distinct roles of these expenditure types is vital for evidence-based budgeting. This study's objective is to analyse the extent of the impact of recurrent and capital expenditures on the availability and functionality of medical equipment in PHCs across the local governments in Borno State.

Primary healthcare centers are always the first contact place for patients in Nigeria, yet many of the PHCs in Borno State lack adequate infrastructure, including functional medical equipment (National Primary Health Care Development Agency [NPHCDA], 2020). A study by UNDP (2022) found that over 60% of PHCs in Borno State require urgent rehabilitation, largely due to the impact of insurgency, inadequate funding, and poor maintenance of health facilities. Public capital expenditure on medical equipment in PHCs is insufficient to meet the growing healthcare needs. According to the Federal Ministry of Health (FMOH, 2021), over 50% of PHCs in Borno State lack essential diagnostic tools and basic medical equipment, such as ultrasound machines, X-rays, and laboratory facilities. This deficiency severely limits the ability of healthcare workers to provide quality care, particularly for maternal and child health services.

Borno State has been one of the most affected regions by the Boko Haram insurgency, leading to the destruction of over 200 healthcare facilities and the displacement of health workers (UNDP, 2022). This insecurity has placed additional pressure on the remaining PHC's and the other tiers of healthcare, which struggle to cope with the healthcare demands of internally displaced persons (IDPs) (Amnesty International, 2021). Limited government expenditure on rebuilding health infrastructure has further exacerbated the crisis. Due to the challenges of inadequate public funding, Nigeria has increasingly turned to public-private partnerships (PPPs) to improve healthcare service delivery (Akinyemi *et al*., 2020). In Borno State, organisations such as the Bill & Melinda Gates Foundation, WHO and Médecins Sans Frontières (MSF) have played a critical role in supplementing government efforts in healthcare provision (UNDP, 2022). However, sustainability remains a challenge due to heavy reliance on external funding. Hence, this study explores how recurrent and capital expenditures, insecurity and NGO's intervention impact on

the availability and functionality of medical equipment in Primary Healthcare centers within the state.

The remaining part of the paper contains the literature review, methodology, results and discussion of findings, conclusion and recommendations.

2. LITERATURE REVIEW

2.1 THEORETICAL REVIEW

This study is tied to the popular Pareto Efficiency principle as part of welfare economics theory, which emphasis that public expenditure should provide societal welfare by allocating resources in a way that benefits the most vulnerable people in the society (Pareto, 1906). In line with this theory, government at all levels should direct their expenditure on improving medical infrastructure to achieve Pareto improvements, where no one will be complaining on any medical situation and as such many should benefit from such. Hence, this study argued that, the targeted health spending on medical equipment can reduce health disparities and ensure increase access to quality healthcare delivery services in Borno state, Nigeria.

2.2 EMPIRICAL REVIEW

This subsection review evidence from cross-country studies and Nigeria-specific studies, highlighting the impact of public capital and recurrent expenditure on health. Studies from cross-country have established a strong relationship between public health expenditure and health service delivery. For instance, Michael and Aloysius (2024) carried out a study on the role of governance quality, health expenditure on health outcomes in west African countries using generalized least squares estimation techniques. The study found that improving the governance composite index improves health outcomes in selected fifteen countries in West Africa. Hence, the study recommended conscious efforts by these countries in resources allocation to the health sector and full implementation of universal health coverage. Similarly, while employing Grossman Human Capital theory, Jaison and Mathew (2020) examined the impact of health expenditure on health indicators in Sub-Saharan Africa (SSA) countries using data sourced from World Bank for 40 SSA countries. The study utilised fixed effect model and discovered that health spending has significantly reduced mortality rates and increased life expectancy at birth. The study recommends deliberate efforts to increase public expenditure. Also, Odinemu and Anago (2025) analyses Nigeria's Universal Health care (UHC) and out of pocket spending and Basic Health Provision Funds (BHCPF). The study emphasis was on how UHC is achieved through the implementation of BHCPF using qualitative and quantitative data analysis. The finding shows that BHCPF is effective when aligned with healthcare needs at the primary healthcare level. The study recommends for public private partnership to provide medical infrastructures.

Furthermore, Ibrahim and rejoice (2022) analyses the connection between public health expenditure and health outcomes in Nigeria using Error Correction M Mechanism (ECM) for a period of 34 years. The found the existence of long run relationship between health and outcomes proxy by under5 mortality rate and life expectancy. Hence it was concluded that public expenditure on health is important in improving quality of life in Nigeria, In the same vain, Lumi *et al*. (2025) evaluates the effects of public expenditure on the provision of primary healthcare in Bauchi State, Nigeria using simple linear regression. The study revealed significant effect of capital expenditure on the provision of infrastructural facilities in primary healthcare centres of Bauchi State indicating increased in government allocation for health equipment. The study recommended increase in capital expenditure for the development and maintenance of health infrastructures in the primary healthcare centres. Also, Joseph and Agada (2024) focused on the

nexus between public health spending and life expectancy in Nigeria using Autoregressive Distributed Lag (ARDL) model. Their finding confirmed that government outlays contribute positively to improvements in life expectancy, though the magnitude was modest relative to expectations. The study discovered that recurrent expenditure often produces quicker health outcomes that capital expenditure which often faces delays and inefficiencies. In addition to employing ARDL model, Akintunde and Olaniran (2022) examined the link between financial development, public health expenditure and health outcomes in Nigeria from 1981 to 2020. The study discovered that government expenditure on health worsened health services delivery for the period under consideration.

A study by Rannan-Eliya and Somerfield (2020) examined health financing trends in Southeast Asian and African countries and found that capital and recurrent expenditure on infrastructure, training and salaries significantly increases healthcare access, patient satisfaction and improves health worker productivity and retention. These findings align with the World Bank (2021) Health Financing Report, which shows that countries with higher public health spending have better-equipped healthcare systems and lower disease burdens. However, in conflict-affected regions, funding is often diverted, leading to persistent challenges in healthcare delivery.

On public expenditure and drug availability in Sub-Saharan Africa, Wagstaff and Claeson (2018) studied public health expenditure in 25 sub-Saharan African countries and found that countries with higher recurrent health speeding experience fewer drug shortages in public hospitals and PHCs. However, poor supply chain management and corruption were identified as major constraints, leading to frequent stock outs despite increased funding. In a similar study, Orji *et al*. (2021) found that decentralised health funding mechanisms in countries like Uganda and Kenya improved drug availability and reduced delays in procurement as compared to centrally managed health budgets. This suggests that the structure of health financing influences its effectiveness.

A review of empirical studies on public health expenditure in Nigeria shows a mixed outcome. In Nigeria, public capital expenditure has played a crucial role in improving health infrastructure, but funding remains inadequate. Fagbamigbe *et al.* (2021) analysed government health spending between 2000 and 2020 and found that states with higher capital health expenditure have better-equipped PHCs and hospitals. However, many PHCs still lack basic amenities like clean water, electricity and sanitation. While, public recurrent expenditure is essential for training and retaining healthcare professionals. A study by Nicholson *et al*. (2015) found that states with higher recurrent health expenditure have better-trained medical personnel and lower staff turnover. However, irregular salary payments and poor working conditions have led to a high rate of health worker migration ("brain drain"). Ekeocha and Uchenna (2021) examined public health budgets across six Nigerian states and found that Over 50% of PHCs lack essential diagnostic tools such as X-rays, ultrasound machines and laboratory equipment. Awoyemi et al. (2023) analysed pharmaceutical supply chains in Nigeria and found that government funding for drug procurement is often insufficient and irregular. The study concludes that corruption in drug distribution network leads to diversion of essential medicines to private markets.

In summary, the empirical review highlights a clear link between public expenditure and healthcare service delivery, but failed to dis-aggregate health spending by the government into recurrent and capital, while being tied to medical equipment and Borno state. These gaps will be addressed in this study by assessing the direct impact of public expenditure on PHCs in Borno State, considering both capital and recurrent spending on medical equipment.

3. **METHODOLOGY**

3.1 Theoretical Framework

Pareto optimality (1906) is a fundamental concept in welfare economics used to evaluate the allocation of resources in a way that no further mutually beneficial exchanges are possible. The general condition:

$U_i = f(x)$…… (1)

Where;

U_i = utility of individual i, in this case, it could be referred to availability of medical equipment used to provide healthcare services.

f = function

x = Resource Allocation, which could be public recurrent and capital expenditures.

3.2 Model specification

The functional relationship between public expenditure and health service delivery proxy by medical equipment is first presented, followed by its econometrics form. Stated below in equation one (1) is the functional relationship between health services delivery indicator and public expenditure variables:

MEDIEQUIP=f(*RECUEXP* +*CAPIEXP*)……(2)

The econometric form of the equation 1 is expressed as;

MEDIEQUIP=$\beta_0+\beta_1 RECUEXP+\beta_2$ *CAPIEXP*+β_3 BHCPF + $\beta_4 NGOINT+\beta_5 INSEC+\mu_1$……(3)

Where:

MEDIEquip = Medical Equipment
RECUEXP = Recurrent Public Expenditure
CAPIEXP = Recurrent Public Expenditure
BHCPF = Basic Healthcare Provision Fund
NGOINT = Non-governmental Organization Intervention
INSEC = Insecurity
β_0 = Intercept
β_1, β_2, β_3, β^4 = Coefficients
μ = Error term

3.3 Variable Measurement: The questionnaire for data collection is structured on a five-point Likert scale: Very Adequate =5, Adequate = 4, Neutral =3, Inadequate = 2, Very inadequate = 1

3.4 Analytical Techniques: The study employed descriptive statistics and Survey Linear Ordinary Least Squares in analysing the data collected. Descriptive statistics embodied mean, standard deviation, minimum and maximum values where necessary. The choice of Survey Ordinary Least Squares is due to the categorical nature of the dependent and independent variables. The dependent variables used in measuring health service delivery are Health Service Delivery Indicator (HSDI) as classified by the World Bank.

3.5 The Dependent Variable: The dependent variable in this study is the Health Service Delivery Indicator (HSDI) measured by Medical Equipment (MEDIEquip), which aim to measure the performance and quality of healthcare service delivery by collecting data on their adequacy, accuracy, availability and functionality.

3.6 The Independent Variables: The independent variables in this study included both recurrent and capital public expenditure. The public expenditure was dis-aggregated into Recurrent Expenditure (RECUEXP) and Capital Expenditure (CAPIEXP). They were measured by the amount of money the government has expended in the purchase of medical equipment for the primary healthcare centres in Borno state within the period under review.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 The Descriptive Statistics:

This subsection reports the mean, standard deviation, minimum and maximum values of the variables under study.

Table 1: The Descriptive Statistics

Variable	Mediequip	Recuexp	Capiexp	Bhcpf	Ngoint	Insec
Mean	29.017	2.302	2.329	4.004	3.153	3.051
Std. Dev	5.273	1.309	1.308	0.962	1.052	1.496
Min.	14.111	1	1	1	1	1
Max.	40.556	5	1	5	5	5

Note: *MEDIEquip = Medical Equipment, Bhcpf = Basic Healthcare Provision Fund, Ngoint = Non-government Organization's Intervention, RECUEXP = Recurrent Public Expenditure, CAPIEXP = Recurrent Public Expenditure, Insec = Insecurity*

The descriptive results in the Table 1.0 indicate variations in key variables related to medical equipment (MEDIEquip) and other healthcare-related expenditures. The means suggest that MEDIEquip have relatively high average value (29.017) with noticeable standard deviations, indicating variability in data distribution. Meanwhile, recurrent expenditure (Recuexp) and capital expenditure (Capexp) shows relatively low mean values (2.302 and 2.329, respectively) with narrow variations.

The minimum and maximum values further highlight disparities across variables. MEDIEquip range widely with minimums at 14.111 and maximums at 40.556 indicating significant differences in healthcare resources and information accessibility. Other variables, such as non-governmental involvement (Ngoint) and insecurity (Insec) have more constrained distributions with means around (3.153 and 3.051) and a maximum value of 5, suggesting a potential ceiling effect. Generally, the data reflect considerable variability across healthcare-related factors, highlighting disparities in resource allocation and accessibility.

4.2 Correlation Analysis

Table 2 Correlation Analysis

Variable	Mediequip	Recuexp	Capexp	Bhcpf	Ngoint	Insec
Mediequip	1					
Recuexp	-0.093	1				
Capexp	-0.171	0.679	1			
Bhcpf	0.104	-0.019	0.012	1		
Ngoint	0.232	0.021	-0.074	0.221	1	
Insec	0.142	0.165	0.09	0.098	0.227	1

Note: *MEDIEquip = Medical Equipment, RECUEXP = Recurrent Public Expenditure, CAPIEXP = Recurrent Public Expenditure,*

Source: Authors compilation (2025)

The correlation matrix in the Table 2 highlights key relationships among healthcare-related variables. Medical Equipment (MEDIEquip) exhibit a moderate positive correlation (0.501), suggesting that improvements capital expenditure Capexp often coincide with better access to medical equipment. Financial factors display different trends. For example, Recurrent Public Expenditure (Recuexp) and Capital Expenditure (Capexp) are strongly correlated (0.679), reflecting a tendency for increased spending in one category to align with the other. However, their weak or negative correlations with MEDIEquip suggesting higher government spending does not necessarily translate into improvements in these areas.

The correlation results suggest that improvements in health infrastructure and medical equipment are interlinked, indicating that investments in one area often support advancements in others. However, weak or negative correlations between public expenditures (Recuexp and Capexp) and key healthcare variables imply that higher government spending does not necessarily translate into better infrastructure, equipment, or training, possibly due to inefficiencies or misapplication of funds. The moderate correlation of NGO intervention (Ngoint) with Mediequip highlights the crucial role of non-governmental organisations in strengthening healthcare systems. Additionally, the weak correlations of insecurity (Insec) with most variables suggest that while insecurity may affect healthcare delivery, it does not appear to be a primary determinant of resource allocation. Overall, the results emphasise the need for more strategic investment in healthcare to ensure that financial resources lead to tangible improvements of infrastructure, personnel training and medical supplies.

4.3 REGRESSION ANALYSIS

Table 3.0: Linear Regression Result

Variable	Mediequip	t-statistics	P-values
Recuexp	-1.442	-2.11	0.102
Capexp	1.504**	2.66	0.056
Bhcpf	1.424**	2.43	0.072
Ngoint	1.514	1.71	0.162
Insec	0.347	1.23	0.285
Demo	1.248***	7.26	0.002
R^2		0.952 (95%)	

Note: *Asterisks (***), (**) and (*) denotes statistical significance at 1%, 5% and 10% levels, respectively*

Source: Authors compilation (2025)

The results of the linear regression shown in Table 3.0, indicates the Recurrent Public Expenditure (RECUEXP) has a statistic insignificant negative relationship with Medical Equipment (MEDIEquip), as shown by the negative coefficient (-1.442) and a P-value of (0.102). This suggests that a higher recurrent public spending is associated with lower availability of medical equipment, potentially due to the fact that medical equipment is not a recurrent expenditure budget item, though contrary to the finding of Lumi *et al*. (2025) where they found a significant effect of public expenditure on the provision of primary healthcare services in Bauchi State. This finding agrees with Ekeocha & Uchenna (2021), where they argued that recurrent expenditure is not a determinant of medical equipment availability. The implication is that increasing the recurrent expenditure alone may not enhance healthcare infrastructure unless it is strategically directed to ensure that essential medical equipment is procured and maintained. This highlights

the need for more efficient budget allocation to balance operational and capital expenses for sustainable healthcare improvements.

The results also indicates that Capital Expenditure (CAPIEXP) has a strong positive and statistically significant effect on Medical Equipment (MEDIEquip) with a coefficient of (1.504) and a p-value of (0.056) corroborating the findings of Micheal and Aloysius (2024) where they found that improving governance composite index improves health outcomes. This finding suggests that higher capital spending leads to better health services delivery due to the availability of medical equipment, reinforcing the impact of strategic capital investment spending in healthcare infrastructure. Unlike recurrent expenditure, which previously shows a negative effect, capital expenditure directly contributes to strengthening medical facilities, thereby highlighting the needs for increased and well-managed long-term investments in healthcare.

The Basic Healthcare Provision Fund (BHCPF) also has a significant positive effect with a coefficient and P-value of 1.424 and 0.072 on medical equipment availability, indicating that targeted healthcare funding using the BHCPF plays a crucial role in improving medical equipment in PHCs in Borno state. This discovery aligns with the study of Odinemu and Anago (2025) where the finding reveals that BHCF is effective when align with healthcare needs of the people at the primary healthcare level, but disagree with Lewis (2006), where they argued that health financing linkages resulted to inconsistency in medical procurement. These findings suggest that when financial resources are allocated specifically for healthcare improvements, they have a meaningful impact on medical equipment availability and functionality. Policymakers should consider enhancing BHCPF allocations and ensuring proper oversight to maximize its effectiveness.

NGO intervention (NGOINT) is positively associated with medical equipment (1.514), though without significance level of statistics with p-value at 0.162. This implies that NGOs contributes in the improvement of medical equipment access, but their impact may vary depending on the scale and scope of their interventions. This discovery corroborates with Akinyemi et al. (2020) which suggest that NGO interventions in health may not necessarily be directed towards funding medical equipment. Hence, strengthening partnerships between governments and NGOs could further enhance healthcare infrastructure, particularly in under-served and crisis ridden area like Borno state, where NGOs often play a critical role.

Insecurity (INSEC) has a weak relevance, but being statistically insignificant value (0.347, p-value = 0.285) with MEDIEquip, suggesting that insecurity does not directly impact medical equipment levels, agreeing with Oladosu et al. (2022), where they found that insecurity leads to health system collapse. However, while it is statistically insignificant, insecurity could still have indirect effects by disrupting healthcare supply chains, deterring investment, or reducing access to medical facilities. Addressing insecurity remains essential for ensuring stable and efficient healthcare service delivery in Borno State.

Demographics (DEMO) shows a strong and highly significant effect with a value (1.248, p-value= 0.002), indicating that population size, qualification and years of experience of the health personnel has a strong relevance on medical equipment availability and functionality. This suggests that PHCs in Borno State with well experienced health workers populations tend to influence the choice of medical equipment to be provided, possibly due to higher demand and resource allocation. Additionally, the high R^2 value (0.952 or 95%) suggests that the model explains a substantial proportion of the variation in medical equipment availability, reinforcing the reliability of these findings for policy and investment decisions.

5. CONCLUSION AND RECOMMENDATIONS

This study investigated the impact of public expenditure dis-aggregate into recurrent and capital expenditures on health services delivery in Borno State using medical equipment as proxy. Also, NGO interventions, insecurity, basic healthcare provision fund (BHCPF) and demographics factors were used as control variables in the study. The study found that public capital expenditure, basic healthcare provision fund and demographics have positive and statistical impacts on the availability of medical equipment in PHCs from Borno State. This is an indication that the capital spending mechanism and BHCPF play a critical role in increasing access to essential medical equipment needed to deliver health services for the people of Borno State. Furthermore, demographic factors such as population, work experience, age of the PHCs have significant influence on the availability of medical equipment due to increase demand on their usage.

Recurrent public spending, NGO interventions and insecurity indicates the absence of statistical impact on the availability of medical equipment within PHCs in Borno State. This implies that the day to day running costs especially consumables, maintenance, salaries and wages are not strong determinant of medical equipment availability in Borno state. It is concluded that despite partnership with NGOs in Borno State, their operations are not directly focused on providing medical equipment in the state healthcare centers, but rather focusing on training of health workers and community health outreach. In addition, the insecurity issue did not show any measurable influence on medical equipment availability, because PHCs in the state are still receiving medical equipment despite the insurgency issue and possibly due to targeted donor interventions and government efforts.

Finally, the findings from this study indicated the relevant roles of capital expenditure of the government and structured funding mechanisms like BHCPF as they ensure the availability of medical equipment across the primary healthcare centres in Borno State, Nigeria.

Given the discoveries of this study, the followings are recommended for policy actions:

i. Since capital spending shown positive influence on medical equipment availability in PHCs from Borno State, the government through the state ministry of finance and health should expand budgetary allocation to PHCs, thereby ensuring more funds are directed towards securing medical equipment

ii. Borno State's government should promote public private partnership that provides conducive environment to attract private investment in infrastructure for PHCs.

iii. Funds allocation should be monitored by the government to guide against diversion and misappropriation by those in charge.

iv. The federal government should strengthen BHCPF by increasing the annual grant 1% of the consolidated revenue to 2%, ensuring that PHCs receives timely and adequate funding for medical equipment to aid patient diagnosis as well as provides access to healthcare for all.

v. The government of Borno State should put in place a need-based funding model, where PHCs with urgent need for equipment receives priority allocation.

vi. There is need for the state government to coordinate the activities of NGOs, so as to integrate medical equipment purchase in their health programs instead of focusing solely on service delivery and training.

vii. There is need to strengthen mechanism for community engagement to align medical equipment procurement with local health needs of the Primary healthcare centers.

viii. The government should ensure prudent spending and not to increase recurrent expenditure.

ix. Lastly, the government should enhance security around healthcare centers to guard against destruction and theft of medical equipment during crisis in Borno State.

REFERENCES

Asaph, P. P. (2024). An Economic Evaluation of the Impact of Corruption on Healthcare Delivery in Nigeria. *International Journal of Economics and Financial Management (IJEFM),* 9(9), 1-13 IIARD | Home - International Institute of Academic Research and Development

Akinyemi, T., Olayemi, A. and Oladipo, F. (2020). Public-private Partnerships in Healthcare Financing: Lessons from Nigerian Primary Health Centres. *Journal of Health Economics and Policy*, 15(2), 75–92.

Akintunde, T. S. and Olaniran, O. D. (2022). Financial Development, Public Health Expenditure and Health Outcomes: Evidence from Nigeria. J*ournal of Economics and Allied Research*,*7*(1),13–24.retrievedfrom http://jearecons.com/index.php/jearecons/article/view/100

Amnesty International. (2021). Health under attack: The Impact of Insurgency on Healthcare in Northeast Nigeria. Retrieved from https://www.amnesty.org

Awoyemi, B. O., Makanju, A. A. Mpapalika, J. and Ekpeyo, R. S. (2023). A Time SeriesAnalysis of Government Expenditure and Health Outcomes in Nigeria. *Journal of Public Health in Africa.*

Bloom, D. E. and Canning, D. (2003). The Health and Poverty of Nations: From Theory to Practice. *Journal of Economic Perspectives*, 17(4), 23–44.

Ekeocha, C. and Uchenna, O. (2021). Drug Availability and Public Health Funding in Nigeria: An Empirical Review. *International Journal of Public Health Research*, 8(4), 103-119.

Federal Ministry of Health (FMOH). (2021). National health sector performance report. Abuja, Nigeria.

Fagbamigbe, A. F., Oyinlola, O. M. Morakokinyo, A. S., Adebowale, O. S and Uthman, A.O. (2021). Assessing Public Health Expenditure and Health Outcomes in Nigeria. *BMC Health Services Research*, 21(1), 567.

Ibrahim, T. M. and Rejoice, D. N. (2022). The Impact of Public Health Expenditure on Health Indicators in Nigeria. *Journal of Economics and Allied Research*,7(1),25-34.

Ijoko. A. O. (2023). A Descriptive Analysis of the Challenges of Public Expenditure on Primary Healthcare centre in FCT, Abuja Nigeria. Arabic Rhetoric and Humanities in the 21st Century: A Festschrift in Honour of Prof. Abubakar Sadiq Idris Wakawa, (175-185). FAMSS, Nigerian Army University Biu, Nigeria.

Ijoko, A.O., Magaji, S. and Gombe, B. M. (2022). Impact of Public Expenditure on Health Services Delivery in Federal Capital Territory, Nigeria. *Kebbi Journal of Economics and Social Sciences (KJESS)*, 4(2), 64-74.

Inuwa, A. K. and Ijoko, A.O. (2025). Effect of Public Health Expenditure on the Under-five Mortality Rate in Nigeria. *KFUPM Journal of Undergraduate Research International,* 1-8, http://dx.doi.org/10.64589/juri/209727

Jaison, C. and Mathew, K. O. (2020). Health care expenditure and health outcomes in sub-Saharan African countries. *African Development Review*, 32(3), 349-361. https://doi.org/10.1111/1467-8268.12444

Joseph, P. and Agada. M. (2024). Public Health Expenditure and Life Expectancy in Nigeria. *Journal Economics and Allied Research*, 9(2), 33-44

Lewis, M. (2006). Governance and Corruption in Public Health Spending: A Cross-country Analysis. *Health Policy and Planning*, 21(2), 95-106.

Lumi, M., Umar, B. and Muhammad, S. D. (2025). Effects of Public Expenditure on the Provision of Primary Health Care in Bauchi State. *AKSU Journal of Administration and Corporate Governance,* 5(2), 33-46. https://doi.org/10.61090/aksujacog.2025.012

Martin, M., Christian, P. and Tiago, C. (20225). A public Health Response to Economic Warfare. *The International Journal of Health Planning and Management***,** 1025-1028. https://doi.org/10.1002/hpm.3940

Michael, K. and Aloysius, N. M. (2024). Health Expenditure, Governance Quality, and Health Outcomes in West African Countries. *The International Journal of Health Planning and Management*, 40(2) 427-441. https://doi.org/10.1002/hpm.3887

Moreno-Serra, R. and Smith, P. C. (2012). Does Progress Towards Universal Health Coverage Improve population health? The Lancet, 386(10000), 917-923. Does progress towards universal health coverage improve population health? - ScienceDirect

Nicholson, R. Yates, W. Warburton, and G. Fontana (2015). Delivering Universal Health Coverage - a Guide for Policymakers: Report of the WISH Universal Health Coverage forum 2015, Retrieved from https://wish.org.qa/wp-content/uploads/2024/01/012E.pdf

National Primary Health Care Development Agency (NPHCDA). (2020). Strengthening Primary Healthcare in Conflict-affected Regions: Borno State Case Study. Abuja, Nigeria.

Odinenu, T. A. and Anago, C. J (2025). Financing Universal Healthcare Coverage in Nigeria Through the Basic Health Care Provision Fund: Challenges and Potential Solutions. *The International Journal of Health Planning and Management*, 40(3), 630-645. https://doi.org/10.1002/hpm.3909

Oladosu, A. O., Chanimbe, T. and Anaduaka, U. S. (2022). Effect of Public Health Expenditure on Health Outcomes in Nigeria and Ghana. *Health Policy OPEN*, 3, 100072. https://doi.org/10.1016/j.hpopen.2022.100072

Orji, A., Ogbuabor, J. E., Mba, P. N. and Anthony-Orji, O. I. (2021). Are Wealthy Countries Always Healthy? Health Outcomes and Public Health Spending Nexus in Nigeria. *SAGE Open*, 11(3). https://doi.org/10.1177/21582440211040793

Pareto, V. (1906). Manual of Political Economy. Geneva: Droz.

Rannan-Eliya, R. and Somerfield, J. (2020). Health System Performance and Public Health Financing: A Comparative Study. *Health Policy and Planning*, 35(3), 567–583.

Savedoff, W. D. and Hussmann, K. (2006). Why are Health Systems Prone to Corruption? Global Corruption Report 2006, 4(3), 1-10.

United Nations Development Programme (UNDP). (2022). Rebuilding Healthcare Infrastructure in Borno State: Challenges and Progress. Retrieved from https://www.undp.org/nigeria

Wagstaff, A. and Claeson, M. (2018). The Role of Public Health Financing in Reducing healthcare disparities in Ssub-Saharan Africa. World Bank Policy Research Working Paper.

World Bank. (2022). Nigeria's healthcare financing report: Addressing Fiscal Constraints and Improving Efficiency. Retrieved from https://www.worldbank.org

World Health Organization (WHO). (2020). Essential Medicines Procurement in Sub-Saharan Africa: Challenges and Solutions. Geneva, Switzerland.

World Health Organisation (WHO). (2021). Health Financing for Universal Coverage: The Role of Government Expenditure. Geneva, Switzerland.

World Health Organisation (WHO). (2022). Atlas of African Health Statistics https://apps.who.int/iris/bitstream/handle/10665/364839/9789290234845eng.pdf?sequence=1&isAllowed