**GLOBAL JOURNAL OF HEALTH RELATED RESEARCHES**
**Vol. 8, No. 1, March 2026 | pp. 51–63**
*Published by the Department of Human Kinetics and Health Education, Faculty of Education, Ahmadu Bello University, Zaria, Nigeria*

# PUBLIC EXPENDITURE, DRUG AVAILABILITY, TRAINING OF PERSONNEL AND HEALTH SERVICES DELIVERY IN PRIMARY HEALTHCARE CENTRES OF BORNO STATE, NIGERIA

Abubakar Orlando Ijoko, Chigozie Chukwu, Godfrey Ihedimma, Joseph Chukwudi Odionye, Hassan Mohammed

[1,3&4] *Department of Economics, School of Management and Social sciences*
*Miva Open University, Abuja*
*Email: abubakar.ijoko@miva.university*
[2]*University of Wolverhampton, United Kingdom*
*chigozie.chukwu@wlv.ac.uk*
*Orcid: 0000-0003-0692-096X*
[5]*Department of Economics, Nigerian Army University Biu (NAUB)*
*Biu, Borno State*
*Hassan.mohammed@naub.edu.ng*

**Abstract**

This study meticulously examines the intricate relationship between public spending and the efficacy of health service delivery within Primary Healthcare Centres (PHCs) in Borno State, Nigeria. Specifically, it delves into how Public Capital (CAPIEXP) and Recurrent Expenditures (RECUEXP), the Basic Health Care Provision Fund (BHCPF), Non-governmental Organisations (NGOs) intervention, and Demographic factors (DEMO) collectively influence the availability of essential drugs and the training of health personnel in PHCs across Borno State. Employing a mixed-methods approach, combining quantitative data analysis from PHCs across the state with qualitative insights, the study revealed compelling findings. Public capital expenditure, the BHCPF, NGO interventions, and demographic factors consistently demonstrate positive and statistically significant impacts on both the training of health personnel and drug availability. Conversely, recurrent expenditure exhibits a negative and significant impact on these crucial aspects of PHC service delivery. These outcomes underscore the paramount importance of strategic, targeted government spending and earmarked funds like the BHCPF, which directly bolster drug supply and personnel training. The study critically exposes the inefficient allocation of recurrent expenditures, often failing to adequately support drug supply, personnel training, and even salary payments. Based on these insights, the study strongly advocates for enhanced prioritization of capital investments by the Borno State government and fostering greater collaboration with NGOs. Such concerted efforts are undeniably vital for elevating the overall healthcare delivery systems in conflict-affected regions such as Borno State, Nigeria.

***Keywords:*** *Public Expenditure, Health Services Delivery, Primary Healthcare Centres*

**How to cite this article:** Ijoko, A. O., Chukwu, C., Ihedimma, G., Odionye, J. C., & Mohammed, H. (2026). Public Expenditure, Drug Availability, Training of Personnel and Health Services Delivery in Primary Healthcare Centres of Borno State, Nigeria. Global Journal of Health Related Researches, 8(1), 51–63.
DOI: https://doi.org/10.67203/gjhrr.2026.1m01dwg5

## INTRODUCTION

Public expenditure on health represents a government's commitment to financing the healthcare needs of its populace (Ijoko, 2023). The profound connection between public spending and healthcare outcomes is extensively documented, with numerous studies highlighting that increased government funding generally correlates with improved accessibility, quality, and efficiency of healthcare services (World Bank, 2023). In low- and middle-income countries, such as Nigeria, public health expenditure plays an indispensable role in fortifying primary healthcare systems, which are fundamental in

addressing common health needs and mitigating the burden of preventable diseases (Olaniyan et al., 2019).

Primary Healthcare Centers (PHCs) serve as the bedrock of a functional healthcare system, offering the first point of community-based services that are both affordable and accessible. Well-funded PHCs are demonstrably linked to enhanced health outcomes, including reduced maternal and child mortality rates and expanded immunization coverage (Adebayo et al., 2021). Conversely, inadequate funding inevitably leads to deficiencies in infrastructure, insufficient medical supplies, and a depleted workforce, all of which directly impede effective service delivery (Médecins, 2022). The World Health Organization (WHO) consistently emphasizes that augmented public spending on health contributes significantly to better health outcomes, encompassing lower mortality rates, improved maternal and child health, and enhanced access to essential medicines (WHO, 2021). However, the level and efficiency of health expenditure vary considerably across regions, directly influencing the effectiveness of healthcare service delivery.

Studies from high-income nations, including Norway, Switzerland, Luxembourg, Qatar, and the United States, unequivocally demonstrate a strong correlation between substantial investment in healthcare systems and improved health indicators. For instance, countries within the Organisation for Economic Cooperation and Development (OECD) typically allocate an average of 8-12% of their GDP to health, a commitment directly associated with higher life expectancy and superior population health outcomes (Angeli, 2024). In stark contrast, low- and middle-income countries, such as Ghana, Guinea, Honduras, Indonesia, and Iran, often see health expenditure fall below the levels required to achieve universal health coverage. Research consistently highlights that in these regions, inadequate funding and inefficient resource allocation severely impede the accessibility and quality of primary healthcare services (Boachie et al., 2020).

Across Africa, the healthcare financing gap is particularly acute. Despite the ambitious commitment under the 2001 Abuja Declaration for African Union countries to allocate at least 15% of their annual budgets to health, most nations continue to fall short of this target. For example, in 2022, only a handful of African countries (Rwanda, Botswana, Togo, Zambia, Ethiopia, Lesotho) met this benchmark, with the average allocation hovering around 8.4% (World Bank, 2023). This chronic under-funding is further exacerbated by inefficiencies in health spending, leading to pronounced disparities in healthcare access and quality between urban and rural areas. Empirical evidence from Ghana and Kenya suggests that increased public health spending can significantly improve health outcomes, particularly in maternal and child health services (Boakye et al., 2024). Nevertheless, persistent structural barriers, including corruption, poor governance, and insufficient infrastructure, frequently limit the tangible impact of these expenditures.

In Nigeria, Africa's largest economy, the healthcare system grapples with persistent challenges stemming from chronic under-investment and inefficiencies in public health expenditure (Ijoko & Mohammed, 2025). Nigeria's political will to prioritize healthcare funding has been historically weak, resulting in an allocation of only 4.1% of GDP to healthcare, significantly below the global average of 9.8% (World Bank, 2023). Furthermore, the health sector in Nigeria has faced enduring obstacles due to inadequate funding, mismanagement, poor resource allocation, and inefficiencies in public health expenditures (Federal Ministry of Health [FMOH], 2022). Mismanagement and delayed disbursement of health funds represent major impediments to effective healthcare delivery. For instance, in Nigeria, only 60% of allocated health funds are fully utilized due to pervasive corruption and inefficiencies (Adebayo et al., 2021). According to the National Health Policy, the primary healthcare system forms the bedrock of Nigeria’s healthcare delivery, catering to over 70% of health needs, particularly in rural and underserved areas (FMOH, 2022). Despite this critical role, significant disparities in the availability and quality of services nationwide strongly suggest that the allocation and utilization of public funds remain suboptimal. For example, federal government health budgets over the last five years consistently show allocations far below the 15% benchmark set by the Abuja Declaration, a deficiency that has severely constrained the development of its healthcare infrastructure (Abuja Declaration, 2001). This profound under-funding is particularly evident in Borno State, where Primary Healthcare Centres struggle to deliver even basic services due to insufficient financial resources (United Nations Children’s Fund [UNICEF], 2023).

Borno State, situated in Northeastern Nigeria, starkly exemplifies the challenges of health service delivery amidst constrained resources and prolonged conflict-related disruptions. Years of insurgency and insecurity have severely debilitated the healthcare infrastructure, rendering many PHCs either non-functional or critically under-resourced (United Nations Office for the Coordination of Humanitarian Affairs [UNOCHA], 2022). Over 45% of PHCs in Borno State were reportedly destroyed during the insurgency (Médecins, 2022). Consequently, public expenditure in the state has been compelled to prioritize maintaining essential services, with budgetary allocation to health growing from ₦15.8 billion in 2020 to ₦51 billion in 2024, representing almost 8% of the total budget. Yet, the adequacy of these efforts in addressing the pressing needs of PHCs remains highly questionable. Despite concerted efforts by the government and international donor organizations, a significant gap persists in infrastructure, workforce availability, medical supplies, and overall service delivery quality. Vulnerable groups, including women, children, and Internally Displaced Persons (IDPs), encounter heightened barriers in accessing quality healthcare. Current statistics paint a grim picture of health outcomes in Borno State: maternal mortality stands at an alarming 1500 deaths per 100,000 live births, immunization rates are below 30%, and only 20% of PHCs meet minimum service delivery standards. These figures unequivocally highlight the inadequacy of funding and resource allocation to the health sector in meeting the growing healthcare needs of the population, particularly in rural and conflict-ridden areas. Furthermore, regional disparities in health service delivery are pronounced across Nigeria; urban areas typically receive superior funding and healthcare services compared to rural and conflict-affected regions like Borno State. Per capita health expenditure in rural Borno State is less than ₦1500 ($1), significantly below the recommended ₦14,250 ($9.50) (UNICEF, 2023).

Empirical evidence consistently indicates a direct relationship between public expenditure and health services delivery, as well as health outcomes such as mortality rates, access to care, and patient satisfaction (Ijoko, et al., 2024; Anyanwu & Erhijakpor, 2009). However, studies specifically focusing on the Nigerian context, and particularly Borno State, remain limited. Research addressing how public expenditure impacts service delivery at PHCs is crucial for informing policy and optimizing resource allocation. Understanding the patterns, challenges, and opportunities in public health spending can provide invaluable insights into how financial investments can effectively strengthen PHC services delivery in conflict-affected regions like Borno State. Drawing from this critical need, this study investigates the empirical relationship between public expenditure and the availability of drugs and training of health personnel at PHCs in Borno State, Nigeria. It assesses the adequacy of public expenditure on health and its impact on the training of health personnel and drug availability in primary healthcare centers in Borno. Such findings are anticipated to contribute significantly to evidence-based policymaking, ensuring that public funds are judiciously directed toward achieving equitable and sustainable healthcare services delivery.

Recent empirical evidence further underscores the critical role of robust financing in strengthening primary healthcare service delivery within Nigeria. Ijoko et al. (2025) studied the impact of public expenditure on the availability of medical equipment and health services delivery in PHCs of Borno State Nigeria employing Survey Linear Ordinary Least Squares method. The study reveals that public capital expenditure impacted on medical equipment availability in PHCs of Borno State which by extension results in health services delivery in the State. Also, a study by Gbeminiyi and Oyeneye (2025) meticulously evaluated immunization service delivery across Primary Healthcare Centres in Akinyele and Lagelu Local Government Areas of Oyo State, employing a mixed-methods approach. Their findings revealed that consistent public funding, particularly through the Basic Healthcare Provision Fund (BHCPF), significantly enhanced outreach activities and immunization service delivery. Specifically, facilities with stable funding demonstrated more regular outreach services, superior cold chain management, and improved performance among healthcare workers (Gbeminiyi et al. 2025). This aligns with broader observations that the BHCPF has improved service availability, infrastructure readiness, and community outreach in various Nigerian contexts (Igbokwe et al., 2024).

The evaluation of public spending's impact on the supply of health services in primary healthcare centers necessitates an in-depth examination of effectiveness, accessibility, and tangible results for local populations. Studies consistently demonstrate a strong correlation between financing levels and the quality of healthcare delivery. For instance, Aliyu et al. (2020) analyzed the spatial distribution and

capacities of public health facilities and assessed their utilization in Biu Local Government Area (LGA) of Borno State, Nigeria. The study identified an unequal distribution of health facilities and severe understaffing, concluding that access to healthcare is significantly influenced by income level and distance to health facilities. Similarly, Mukhtar et al. (2024) highlighted the critical role of public funds in improving access to essential health services within Jere Local Government Area of Borno State, discovering a significant positive impact on healthcare delivery. However, Balami et al. (2019) assessed the effect of government budgetary allocation on health status in Borno State, Nigeria, finding that despite rising health budgets, health outcomes remained poor due to corruption, poor planning, and political interference. They recommended effective legislative oversight to curb corruption.

Further research by Omodero (2019) indicates that government expenditure on social sectors, including health, contributes positively to human development outcomes, though the impact is often diluted by poor budget implementation and mismanagement. Likewise, Onisanwa (2014) found that improvements in health indicators significantly contribute to economic growth in Nigeria, reinforcing the imperative of sustained investment in the health sector.

In a related study, Ata-Agboni et al. (2024) appraised the implementation of the health service delivery component of the National Health Development Plan (NSHDP) in Kogi State, Nigeria. Their findings revealed that healthcare in Kogi State suffers from inequitable distribution and a dearth of essential resources, suggesting the need for more equitable policies and regular auditing. Conversely, the detrimental effects of inadequate funding on health services are starkly illustrated by Balami et al. (2023). Their research demonstrates how insufficient public spending leads to significant deficiencies in service provision, particularly affecting vulnerable populations in conflict-affected areas like Borno State. They argue that healthcare facilities, facing financial constraints, struggle to maintain operational effectiveness, resulting in service delays and insufficient coverage. The study concludes that without adequate public expenditure, the health system cannot adequately respond to public health emergencies or invest in preventive measures, thereby undermining long-term health outcomes.

Amusa et al. (2023) provided evidence emphasizing the importance of public allocation in improving access to medical care services, thereby enabling greater participation of marginalized groups. This is particularly pertinent in regions such as Borno State, where health infrastructure has historically been underdeveloped due to a confluence of ongoing economic challenges and conflicts. Furthermore, Udenta and Udenta (2019), in their assessment of primary health care delivery at the community level in Enugu East Local Government Area (LGA) in Nigeria, found that rural primary healthcare is hindered by poor funding and infrastructural decay. They recommended strengthening local government support for primary healthcare centers.

The issue of accessibility and affordability is intrinsically linked to health equity, which is fundamental to addressing the diverse needs of local populations. Musa et al. (2024) emphasized that public investment in primary healthcare extends beyond merely expanding physical access; it is equally about ensuring that marginalized and at-risk groups are prioritized in resource allocation. Focusing on Sub-Saharan Africa, Boachie et al. (2020) provided further empirical support, demonstrating that public health expenditure has a positive and significant effect on healthcare delivery and population health. These components form part of a broader strategy aimed at promoting equitable access and fostering positive health outcomes for the local population. The evidence gathered consistently highlights the vital role that public spending plays in shaping a responsive and effective health landscape, ultimately reflecting a commitment to improving the well-being of communities in Borno State.

## METHOD

This study adopted a cross-sectional research design, utilizing a sample size of 263 primary healthcare centers for the quantitative analysis. Copies of the questionnaire were administered to respondents across the three Senatorial Zones of Borno State. The PHCs were selected using a stratified purposive sampling technique, a method chosen due to the prevailing insecurity in certain areas, which rendered some regions inaccessible during the study period. This approach ensured that accessible PHCs from each senatorial zone (North, Central, and Southern Borno State) were adequately represented.

To achieve the stated objectives, a mixed-methods approach was employed, integrating a meticulously structured questionnaire with a five-point Likert scale and FGDs. The questionnaire underwent a rigorous development process to ensure its relevance and clarity. Initially, a comprehensive literature review of similar studies informed its design. Subsequently, senior faculty members, recognized experts in the field, critically scrutinized the questions for their suitability. A pilot study involving 20 respondents was then conducted to ascertain the measurability and comprehensibility of the instrument, leading to several adjustments based on the feedback received. The combination of quantitative and qualitative methods allowed for a nuanced and detailed analysis of the impact of public expenditure on health service delivery within Borno State's PHCs.

The empirical investigation spanned all three Senatorial Zones of Borno State, Nigeria. The study population comprised 764 public registered Primary Health Care Centres in Borno State, as documented in the Federal Ministry of Health's database.

**Sampling and Sample Size:** The sample size was obtained from the population using Taro Yamane's formula.

$$n = \frac{N}{1} + N(e)^2$$

where:

$n$ is the sample size

$N$ is the total population

$e$ is the margin of error (it could be 0.10, 0.05 or 0.01)

$$n = \frac{764}{1} + 764(0.05)^2$$

$$n = \frac{764}{1} + 764(0.0025)$$

$$n = \frac{764}{1} + 1.91$$

$$n = \frac{764}{2.91}$$

$$n = 262.5$$

$$n = 263$$

Therefore, a total number of Two Hundred and Sixty-Three (263) Primary Healthcare Centers were sample across three (3) Senatorial Zones of Borno State.

**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

**Model Specification**

The functional relationship between public expenditure and health service delivery is first presented, followed by its econometrics form.

Stated below in equation one (1) is the functional relationship between health service delivery indicator and public expenditure variables:

$$HSDI = f(PUEXP) \quad \ldots\ldots (1)$$

where:

HSDI = Health Service Delivery Indicators (Training of health personnel and Drugs availability)

HSDI = f(TRHP, DRA) …… (2)

where:

HSDI = Health Service Delivery Indicator

TRHP = Training of health personnel

DRA = Drug Availability

**Model Specification to Assess the Impact of Recurrent Expenditure on Training of Health Personnel in PHCs of Borno State.**

Functional form of the model:

TRHP = f(CAPIEXP + RECUEXP + NGOINT + BHCPF + DEMO + INSEC) …… (3)

Where:

TRHP = Training of Health Personnel

CAPIEXP = Capital Expenditure

RECUEXP = Recurrent Expenditure

NGOINT = NGO Intervention

BHCPF = Basic Health Care Provision Fund

DEMO = Demographic factors

INSEC = Insecurity

Correspondingly, the econometrics model is given as:

$TRHP = \beta_0 + \beta_1 CAPIEXP + \beta_2 RECUEXP + \beta_3 NGOINT + \beta_4 BHCPF + \beta_5 DEMO + \beta_6 INSEC + \mu$……. (4)

Where:

$TRHP_i$ = Training of Health Personnel

$\beta_0$= Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \beta_6$ = Coefficients

$\mu$ = Error term

**Model Specification on the Impact of Recurrent Public Expenditure on Drug Availability in PHCs of Borno State.**

DRA = f(CAPIEXP + RECUEXP + NGOINT + BHCPF + DEMO + INSEC) …… (5)

Where:

DRA = Drug Availability

CAPIEXP = Capital Expenditure

RECUEXP = Recurrent Expenditure

NGOINT = NGO Interventions

BHCPF = Basic Health Care Provision Fund

DEMO = Demographic factors

INSEC = Insecurity

Correspondingly, the econometrics model is given as:

$$DRA = \beta_0 + \beta_1 CAPIEXP + \beta_2 RECUEXP + \beta_3 NGOINT + \beta_4 BHCPF + \beta_5 DEMO + \beta_6 INSEC + \mu \quad \ldots\ldots(6)$$

Where:

$\beta_0$= Intercept

$\beta_1, \beta_2, \beta_3, \beta_4\ \beta_5\ \beta_6$ = Coefficients

$\mu$ = Error term

## 4.0 Results

This section presents the empirical findings derived from the econometric models, followed by a comprehensive discussion of their implications.

### Impact on Training of Health Personnel (TRHP)

**Table 1: Regression Results to Measure the Impact of Public Recurrent Expenditure on the Training of Health Personnel in PHC of Borno State.**

| Variables | Coefficients | t-statistics | P-values |
|---|---|---|---|
| RECUEXP | -0.356 | -1.45 | 0.220 |
| CAPIEXP | 0.376*** | 3.1 | 0.036 |
| BHCPF | 0.733*** | 10.24 | 0.001 |
| NGOINT | 0.189 | 1.51 | 0.207 |
| INSEC | 0.105 | 1.33 | 0.253 |
| DEMO | 0.322*** | 12.4 | 0.0000 |
| $R^2$ | 0.954 (95%) | | |

*Note: Asterisks (*****), (******) and (*******) denote statistical significance at 1%, 5% and 10% levels, respectively. Source: Authors' computation (2025)*

The regression results presented in Table 1, addressed the determinants of Training of Health Personnel (TRHP), indicate a robust model fit with an $R^2$ value of 0.954 (95%). This signifies that the independent variables collectively explain 95.4% of the variation in the training of health personnel. Among these variables, Capital Expenditure (CAPIEXP), the Basic Healthcare Provision Fund (BHCPF), and Demographic factors (DEMO) demonstrate positive and statistically significant effects on the training of health personnel in PHCs across Borno State, Nigeria. Conversely, Recurrent Public Expenditure (RECUEXP) exhibits a negative, albeit statistically insignificant, impact on TRHP. This finding is somewhat counter-intuitive, as training personnel is typically categorized under recurrent expenditures. NGO Intervention (NGOINT) and Insecurity (INSEC) show weaker influences, with NGOINT reaching only marginal significance.

Specifically, Capital Expenditure (CAPIEXP) positively influenced TRHP ($t = 3.10$, $p < 0.01$), underscoring the vital role of long-term investments in infrastructure and resources for effective training programme. More notably, the BHCPF exerts the strongest effect ($t = 10.24$, $p < 0.01$), suggesting that

structured government funding significantly enhances training initiatives. This highlights the critical importance of consistent financial support for skill development within the healthcare sector. Demographic factors (DEMO) also demonstrate a highly significant positive effect ($t = 12.40$, $p < 0.01$), implying that population characteristics, such as size, age structure, and the overall demand for healthcare services, are key drivers for the need for well-trained personnel. This suggests that regions with larger or aging populations may necessitate greater investment in workforce development to adequately meet evolving healthcare demands.

In contrast, Recurrent Expenditure (RECUEXP) has a negative and statistically insignificant effect ($t = -1.45$), indicating that routine spending on salaries and operational costs does not necessarily translate into improved training outcomes. This suggests that an over-reliance on recurrent expenditure without dedicated and targeted training programme may inadvertently limit skill development. NGO Intervention (NGOINT) shown a marginally positive influence ($t = 1.51$, $p < 0.10$), suggesting that while NGOs contribute to training efforts, their impact remains somewhat limited without complementary government action. Meanwhile, Insecurity (INSEC) has a weak and statistically insignificant effect ($t = 1.33$), implying that direct security challenges may not directly impede training initiatives but could have indirect consequences on resource allocation and personnel retention in PHCs of Borno State.

In conclusion, government-backed healthcare financing and strategic capital investments emerge as the most critical factors for enhancing TRHP. While NGO efforts and demographic factors play supportive roles, recurrent expenditure appears less effective in improving training outcomes. Policymakers are therefore urged to prioritize structured funding and strategic investments in infrastructure to cultivate a well-trained healthcare workforce capable of meeting the growing population's needs.

### Impact on Drug Availability (DRA)

**Table 2: Regression Results to Measure the Impact of Public Recurrent Expenditure on Drug Availability in PHCs of Borno State.**

| Variables | Coefficients | t-statistics | P-values |
|---|---|---|---|
| RECUEXP | -0.618** | -2.77 | 0.050 |
| CAPIEXP | 0.464*** | 3.12 | 0.035 |
| BHCPF | 0.647*** | 4.82 | 0.009 |
| NGOINT | 0.399*** | 4.16 | 0.014 |
| INSEC | 0.082 | 1.78 | 0.150 |
| DEMO | 0.316*** | 5.2 | 0.007 |
| $R^2$ | 0.944 (94%) | | |

*Note: Asterisks (*****), (******) and (*******) denote statistical significance at 1%, 5% and 10% levels, respectively. Source: Authors' computation (2025)*

**Table 2 presented the regression results for factors influencing Drug Availability (DRA), revealing a strong explanatory power with an $R^2$ of 0.944 (94%). This indicates that the independent variables account for a substantial portion of the variation in drug availability. Among these factors, Capital Expenditure (CAPIEXP), the Basic Healthcare Provision Fund (BHCPF), NGO Intervention (NGOINT), and Demographic factors**

**(DEMO) demonstrated strong positive and statistically significant effects on drug availability in PHCs of Borno State, Nigeria, with p-values of 0.035, 0.009, 0.014, and 0.007, respectively. Conversely, Recurrent Public Expenditure (RECUEXP) exerted a negative influence on drug availability, while Insecurity (INSEC) shown a weak but positive effect.**

The positive effect of Capital Expenditure (CAPIEXP) ($t = 3.12$, $p < 0.01$) suggests that long-term investments in healthcare infrastructure directly contribute to improve drug availability. This could be attributed to investments in robust drug storage facilities and efficient distribution networks. Similarly, the BHCPF has a highly significant and positive effect ($t = 4.82$, $p < 0.01$), indicating that dedicated public health funding is essential for ensuring a consistent supply of drugs to healthcare facilities, thereby highlighting the importance of structured government investments. NGO Intervention (NGOINT) also shown a significant positive effect ($t = 4.16$, $p < 0.01$), suggesting that NGOs play a crucial supplementary role in bolstering government efforts to ensure drug availability, particularly in resource-constrained settings. Demographic factors (DEMO) ($t = 5.20$, $p < 0.01$) indicated that the size and characteristics of the population such as age distribution and healthcare needs are critical in determining the demand for and efficient distribution of drugs, reinforcing the necessity for targeted healthcare strategies.

On the other hand, Recurrent Expenditure (RECUEXP) exhibited a significant negative effect ($t = -2.77$, $p < 0.01$). This suggests that higher operational costs might divert funds away from essential areas like drug procurement, thereby diminishing the overall effectiveness of the healthcare system. This finding underscores the critical need for careful budget allocation, ensuring that operational expenditures do not inadvertently overshadow vital areas such as drug supply. Insecurity (INSEC) shown a weak but statistically insignificant positive effect ($t = 1.78$, $p < 0.10$), implying that while insecurity may have a minor impact on drug availability, it is not a primary determinant. However, the indirect consequences of insecurity, such as disruptions to resource allocation or hindered transportation routes, could still pose significant challenges to the drug supply chain.

These findings collectively emphasize the importance of capital investments and dedicated public health funding in ensuring adequate drug availability. NGOs can play a vital supportive role in enhancing drug access, particularly in underserved regions. However, the negative impact of recurrent expenditure highlights the imperative for efficient resource management to prevent undermining essential healthcare services. Demographic considerations should guide drug distribution strategies, and while insecurity has some influence, it remains secondary to the financial and institutional factors that primarily drive drug availability in PHCs of Borno State, Nigeria.

## Discussion of Results

The study's findings revealed that public capital expenditure significantly supports the training of health personnel in PHCs within Borno State, Nigeria. This positive correlation can be attributed to increased funding for training facilities, procurement of essential training materials, and the development of infrastructure conducive to continuous medical education and professional development in the region. This observation aligns with the perspective of Stiglitz (2019), who posited that public sector investment is crucial for building institutional capacity and fostering professional growth. The positive relationship further suggests that strategic capital investments in PHCs create expanded opportunities for on-site training, workshops, and continuing education programme, thereby substantially strengthening human capital development within Borno State's healthcare sector. Additionally, the Basic Health Care Provision Fund (BHCPF), established to ensure minimum basic healthcare services for the populace, was also found to have a positive and statistically significant association with the training of health personnel in PHCs. This indicates that the BHCPF's mandate extends beyond merely allocating resources for service delivery to actively building the capacity of healthcare workers through training initiatives. This discovery corroborates findings by Gbeminiyi et al. (2025), where their findings suggests that BHCPF implementation has demonstrably improved staff capacity and service readiness in PHCs across Nigeria. The results also highlight a positive and statistically significant relationship between demographic factors and the training of PHC personnel in Borno State. This implies that demographic considerations, such as population size, density, and urban-rural distribution, influence both the demand for healthcare services and the government's prioritization of training programme.

The quantitative analysis further revealed that while public capital expenditures, the BHCPF, NGO interventions, and demographic factors exhibit a positive and statistically significant relationship with drug availability in PHCs within Borno State, public recurrent expenditure demonstrated a negative but statistically significant relationship with drug availability. The positive and statistically significant relationship between capital expenditure and drug availability, though initially counter-intuitive given capital expenditure's typical focus on long-term assets, can be explained. This finding contrasts with Okunlola et al. (2025), who observed a negative relationship between government capital investments in healthcare and the availability of essential medicines in Nigerian PHCs. The discrepancy in findings may stem from the possibility that a portion of capital expenditure in Borno State has been strategically directed towards developing robust drug storage and distribution systems, including warehouses and transportation logistics, which directly facilitate a consistent drug supply. Furthermore, the BHCPF was found to have a statistically positive impact on drug availability in Borno State's PHCs, aligning perfectly with the fund's mandate under the National Health Act (2014), which specifically allocates a significant portion of health sector funding for the procurement of essential medicines and medical supplies. NGO interventions also demonstrate a positive and statistically significant relationship with drug availability in PHCs. This underscores the crucial supportive role NGOs often play in conflict-affected and underserved regions like Borno State, frequently providing vital medical supplies and supplementary funding. This result is consistent with findings from the WHO (2021) and UNICEF (2020), which have documented how NGOs effectively bridged critical gaps in medicinal supply chains in northeastern Nigeria, particularly during the peak of the insurgency.

Conversely, demographic factors positively and significantly influence drug availability in PHCs of Borno State. PHCs located in more populated or easily accessible areas are more likely to receive regular drug supplies due to enhanced logistical efficiency and political visibility. The negative impact of recurrent expenditure on drug availability is a critical finding, suggesting that operational costs, if not managed efficiently, can divert funds from essential drug procurement. This highlights a significant challenge in resource allocation, where day-to-day operational expenses may inadvertently compromise the availability of life-saving medicines. The weak, albeit positive, effect of insecurity on drug availability suggests that while direct conflict may not be the primary determinant, its indirect consequences, such as disrupted supply routes and population displacement, can still pose substantial challenges to maintaining a consistent drug supply.

## CONCLUSION

This study has provided compelling evidence regarding the multifaceted impact of public expenditure, drug availability, training of health personnel, and health services delivery in Primary Healthcare Centres (PHCs) within Borno State, Nigeria. The findings unequivocally demonstrate that public capital expenditure, the Basic Health Care Provision Fund (BHCPF), NGO interventions, and demographic factors all exert a positive and statistically significant influence on both the regular training of health workers and the availability of essential drugs, health infrastructure, and medical equipment in PHCs across Borno State. Crucially, NGO support emerges as a vital component, effectively filling operational and supply chain gaps in a region profoundly affected by conflict.

The study outcomes underscore the imperative for strategic and sustained public expenditure, particularly for medical equipment and drug supply, robust health infrastructure provision, and the continuous strengthening of human capital in PHCs. This is especially critical in conflict-affected regions like Borno State, where resilient health service delivery is paramount. The research calls for a fundamental reassessment of public health spending priorities, advocating for a shift towards results-based budgeting to ensure the efficient and effective utilization of resources. Furthermore, the qualitative analysis illuminated several critical health outcomes, including the significant distances of many PHCs from beneficiaries, persistent lack of essential drugs, chronic shortages of medical personnel, inadequate bed spaces, and the unfortunate closure of some PHCs due to insurgencies.

## RECOMMENDATIONS

i. **Strengthen and Scale BHCPF Implementation:** The Borno State Government, in collaboration with the Federal Government, should intensify efforts to strengthen and expand the utilization of the

BHCPF in PHCs across the state. This must be coupled with regular, rigorous performance audits to ensure the fund's transparent and effective utilization.

ii. **Leverage NGO Support:** The Borno State Government should actively leverage the invaluable support offered by Non-Governmental Organizations for emergency drug supplies. Furthermore, NGOs should be encouraged and facilitated to participate in training local PHC staff, thereby enhancing local capacity and sustainability.

iii. **Improve Recurrent Expenditure Management:** The State Government needs to significantly improve the allocation, management, and efficiency of recurrent expenditures. This can be achieved by adopting results-based financing mechanisms that are measurable and specifically directed towards impactful projects within PHCs across Borno State.

iv. **Demographic-Guided Drug Distribution:** The Borno State Government must ensure the systematic use of demographic data to guide equitable drug distribution strategies. This involves developing and implementing minimum drug availability standards tailored to the unique demographic profile and needs of each PHC.

v. **Ensure Effective Drug Revolving Fund (DRF) Operation:** The Borno State Government should guarantee the effective and sustainable operation of the Drug Revolving Fund (DRF) in every PHC within the state. This mechanism is crucial for ensuring a continuous and accessible supply of essential medicines.

## REFERENCES

Abuja Declaration. (2001). The Abuja Declaration on HIV/AIDS, tuberculosis and other

related infectious diseases. African Union. https://au.int

Adebayo, E., Okechukwu, A., & Omotola, J. (2021). The impact of public health expenditure

on child mortality in Nigeria: Evidence from sub-national analysis. *International Journal of Public Health, 10(3), 25–39.*

Aliyu, U. A., Kolo, M. A., & Chutiyami, M. (2020). Analysis of distribution, capacity and

utilization of public health facilities in Borno, North-Eastern Nigeria. *Pan African Medical Journal*, 35(1). https://doi.org/10.11604/pamj.2020.35.1.211058

Amusa, L. B., et al. (2023). Spatial variations and determinants of malnutrition among under-

five children in Nigeria: A population-based cross-sectional study. *PLoS ONE*, 18(4), Article e0284270. https://doi.org/10.1371/journal.pone.0284270

Angeli, F. (2024). Delivering healthcare in developing economies: Challenges and

opportunities. *Taylor & Francis*.

Anyanwu, J. C., & Erhijakpor, A. E. O. (2009). Health expenditures and health outcomes in

Africa. *African Development Review*, 21(2), 400–433. https://doi.org/10.1111/j.1467-8268.2009.00215.x

Ata-Agboni, J. U., & Noah, H. (2024). Implementation of health service delivery component

of the National Strategic Health Development Plan in Kogi State, Nigeria (2018-2022). *Journal of Good Governance and Sustainable Development in Africa* (JGGSDA), 8(5), 1–18. http://journals.rcmss.com/index.php/jggsda

Balami, E. A., Adamu, M., & Ibrahim, A. (2023). Effects of inter-professional conflict on

health service delivery in selected hospitals in Borno State, Nigeria. *International Journal of Management and Social Science Research Review*, 7(1), 1–10. https://www.researchgate.net/publication/370953679_Effects_of_Inter-Professional_Conflict_on_Health_Service_Delivery_in_Selected_Hospitals_in_Borno_State_Nigeria

Balami, E. A., Ahmed, F., & Abdullahi, A. (2019). Effect of budgetary allocation on health

status of beneficiaries in Maiduguri Metropolitan Council. *International Journal of Intellectual Discourse* (IJID), 2(2), 59–66.

Boachie, M. K., Tajana, P., & Frimpong, A. O. (2020). Infant mortality in low- and middle-

income countries: Does government health spending matter? *Journal of Development Policy and Practice*, 5(1). https://doi.org/10.1177/2455133320909916

Boakye, K., Owusu, A. A., & Boateng, D. (2024). Patient satisfaction with quality of care at

outpatient departments in selected health facilities in Kumasi, Ghana. *BMC Health Services Research.*

Federal Ministry of Health. (2022). Health sector budget analysis for Nigeria.

https://www.health.gov.ng

Gbeminiyi, O. T., & Oyeneye, A. I. (2025). Evaluation of immunization service delivery in

primary healthcare centers in Akinyele and Lagelu Local Government Areas, Oyo State, Nigeria. *SAGE Open Medicine*, 13. https://doi.org/10.1177/20503121251352974

Ibrahim, Z. A., Konlan, K. D., Moonsoo, Y., Kwetishe, P., Ryu, J., & Yoon, K. (2023).

Influence of Basic Health Care Provision Fund in improving primary healthcare services in Nigeria. *BMC Health Services Research*, 23(1), Article 10463796. https://doi.org/10.1186/s12913-023-10463796

Igbokwe, U., Ibrahim, R., Aina, M., Umar, M., et al. (2024). Evaluation of the National Primary

Health Care Development Agency (NPHCDA) gateway for the Basic Healthcare Provision Fund (BHCPF) across six Northern States in Nigeria. *BMC Health Services Research*, 24, Article 11867. https://doi.org/10.1186/s12913-024-11867-3

Ijoko, A. O. (2023). A descriptive analysis of the challenges of public expenditure on primary

healthcare centre in FCT, Abuja Nigeria. In 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.

Ijoko, A. O., Magaji, S., & Gombe, B. M. (2024). 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.

Ijoko, A. O., & Mohammed, S. S. (2025). Revisiting the forecasting power of public health

expenditure and climate change impact on life expectancy in Nigeria: A scenario analysis. *Journal Economy*, 12(1), 1–7. https://doi.org/10.20448/economy.v12i1.6521

Ijoko, A. O. Mohammed, H., Haruna, S. & Zakari I. (2025). Impact of public expenditure on

the availability of medical equipment and health services delivery in primary healthcare centers of Borno state, Nigeria. *Journal of Economics and Allied Research*, 10(3*)*, 256-267. View article

Médecins Sans Frontières. (2022). Healthcare challenges in conflict-affected Borno State: A

field analysis. https://www.msf.org

Mukhtar, F., Ishaq, A. B., & Daniel, T. A. (2024). Primary healthcare access and utilisation in

the Jere Local Government Area of Borno State, Nigeria. AJSBS, 14(6). https://www.researchgate.net/publication/385182824_PRIMARY_HEALTHCARE_ACCESS_AND_UTILISATION_IN_THE_JERE_LOCAL_GOVERNMENT_AREA_OF_BORNO_STATE_NIGERIA

Musa, S. S., et al. (2024). Revitalizing the state of primary healthcare towards achieving

universal health coverage in conflict affected fragile northeastern Nigeria: Challenges, strategies, and way forward. *Narax Journal*, 1(1), 1–15. https://narrax.org/main/article/download/178/112

National Health Act. (2014). Federal Republic of Nigeria Official Gazette.

Okunlola, K. A., Ojo, I. O., Ohaeri, B., & Babarimisa, O. (2025). Challenges facing primary

health care services utilization and possible solutions. *Euro Global Contemporary Studies Journal* (EGCSJ), 2(5), 1–12. https://doi.org/10.5281/zenodo.15382527

Olaniyan, D., Ajayi, O., & Bello, A. (2019 ). Public health expenditure and maternal health

outcomes in Nigeria: Evidence from national data. *African Journal of Health Economics*, 8(2), 12–30. https://doi.org/10.4314/ajhe.v8i2.2

Omodero, C. O. (2019). Government general spending and human development: A case study

of Nigeria. *Academic Journal of Economic Studies*, 5(1), 136–143.

Onisanwa, I. D. (2014). The impact of health on economic growth in Nigeria. *Journal of*

*Economics and Sustainable Development*, 5(19), 159–166.

Stiglitz, J. E. (2019). The economics of the public sector. W. W. Norton & Company.

Udenta, J., & Udenta, N. (2019). The local government and challenges of primary healthcare

delivery in Enugu State East Local Government Area Nigeria. *Journal of Contemporary Research in Social Sciences*, 1(2), 38–54. https://doi.org/10.33094/26410249.2019.12.38.54

UNICEF. (2020). Nigeria humanitarian situation report No. 12, January-December 2020.

https://www.unicef.org/media/92391/file/UNICEF-Nigeria-Humanitarian-Situation-Report-No.-12-January-December-2020.pdf

UNICEF. (2023). Assessment of primary healthcare facilities in Borno State, Nigeria.

https://www.unicef.org

United Nations Office for the Coordination of Humanitarian Affairs. (2022). Nigeria:

Humanitarian needs overview. https://www.unocha.org

World Bank. (2023 ). World development indicators: Public health expenditure as a percentage

of GDP. https://data.worldbank.org

World Health Organization. (2021). Health interventions in conflict zones: The case of Borno

State, Nigeria. WHO Regional Office for Africa. https://www.afro.who.int/publications