

# Functionality assessment of primary healthcare services in Ebonyi State under the basic healthcare provision fund

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## Abstract

Primary Healthcare (PHC) constitutes the foundation of Nigeria's health system and is critical to achieving Universal Health Coverage (UHC). Despite several reforms, PHC performance has historically been constrained by inadequate financing, shortages of skilled health workers, infrastructure deficiencies, and weak medicine supply chains. The Basic Healthcare Provision Fund (BHCPF) was introduced to address these systemic gaps; however, empirical evidence on the functionality of PHC services under the BHCPF at subnational level remains limited. The aim of the study was to assess the functionality of primary healthcare services in Ebonyi State under the BHCPF and to examine the influence of essential drug availability, healthcare workforce adequacy, and effectiveness of BHCPF implementation on perceived quality of care and patient satisfaction. A facility-based cross-sectional study with quantitative survey and qualitative Key Informant Interviews (KIIs) was conducted in 2023 across BHCPF-supported PHCs in Ebonyi State. Quantitative data were collected exclusively from healthcare workers and facility managers (n=200) using a 5-point Likert-scale questionnaire. Staff-reported patient satisfaction was measured as a proxy outcome and dichotomised at mean score  $\geq 3.5$  versus  $< 3.5$ . Multivariable linear and logistic regression models adjusted for age, gender, and professional role were performed. Qualitative data were obtained through key in-depth Interviews on a sample of managers of health facilities and Coordinators of Local Governments. Qualitative data was processed through thematic analysis. Of the 212 questionnaires distributed, 200 were valid for analysis (response rate 94.3%). Healthcare workforce adequacy and availability of essential drugs emerged as the strongest independent predictors of perceived quality of care ( $\beta=0.42$  and  $\beta=0.35$ ;  $p<0.001$ ). Patient satisfaction was significantly associated with workforce adequacy (OR=2.50), essential drug availability (OR=2.10), and effectiveness of BHCPF implementation (OR=1.60). BHCPF implementation has contributed positively to PHC functionality in Ebonyi State, particularly through improved access to essential medicines and workforce support. Sustained financing, strengthened accountability mechanisms, and equitable scale-up across PHCs are necessary to consolidate gains and accelerate progress towards UHC.

**Key words:** primary healthcare; basic healthcare provision fund; functionality; health systems; Ebonyi state.

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## Introduction

Primary Healthcare (PHC) is globally recognised as the most cost-effective and equitable approach to achieving population health improvement and Universal Health Coverage (UHC).<sup>1,2</sup> The Alma-Ata Declaration of 1978 and its reaffirmation through the Astana Declaration underscore PHC as the cornerstone of health systems, particularly in Low- and Middle-Income Countries (LMICs).<sup>2</sup> In Nigeria, PHC is designed to serve as the first point of contact for individuals, families, and communities, delivering essential promotive, preventive, curative, and rehabilitative services.<sup>3</sup> Despite its strategic importance, PHC in Nigeria has historically suffered from chronic underfunding, weak governance, poor infrastructure, inadequate human resources, and fragmented service delivery, resulting in suboptimal performance and poor health outcomes.<sup>1,4</sup> Nigeria operates a three-tier health system comprising federal, state, and local government responsibilities. While tertiary

and secondary services receive relatively greater attention and investment, PHC facilities - largely managed by local governments - have remained under-resourced.<sup>5,6</sup> This imbalance has contributed to inequitable access to basic services, high out-of-pocket expenditure, and avoidable morbidity and mortality, particularly among rural and vulnerable populations. Maternal, neonatal, and under-five mortality indicators in Nigeria remain among the highest globally, reflecting systemic weaknesses at the PHC level.<sup>7</sup> In response to these challenges, the National Health Act of 2014 established the Basic Healthcare Provision Fund (BHCPF), earmarking at least one per cent of the Consolidated Revenue Fund for the financing of essential PHC services.<sup>3,4</sup> The BHCPF was conceptualised as a transformative mechanism to strengthen PHC through predictable financing, improved governance, and accountability.<sup>4</sup> The Fund supports essential drug supply, human resources for health, basic equipment, infrastructure maintenance, and service delivery through accredited PHC facilities.<sup>5</sup>

Operationalisation of the BHCPF commenced nationally in 2018, with states required to meet minimum readiness criteria to access funds.<sup>9,10</sup> The rollout of the BHCPF offered an opportunity to address these longstanding gaps. However, variability in implementation fidelity, fund disbursement timelines, and management capacity across facilities raises questions regarding the actual functionality of PHC services under the BHCPF framework.<sup>11,12</sup> PHC functionality is defined as the extent to which facilities possess minimum structural and operational requirements - including trained personnel, essential medicines, infrastructure, governance systems, and predictable financing - to consistently deliver quality services. Limited subnational evidence exists linking BHCPF implementation to specific functionality domains and experiential outcomes in southeastern Nigeria.<sup>13,14</sup> Assessing functionality is critical for understanding whether financing reforms translate into tangible service improvements. Empirical evidence from Nigeria and comparable LMICs suggests that financing alone is insufficient without concurrent strengthening of supply chains, workforce management, and accountability structures<sup>15</sup>. Studies have reported mixed outcomes of PHC revitalisation initiatives, highlighting the need for context-specific evaluations.<sup>11,12,16</sup> This study therefore aimed to assess the functionality of primary healthcare services in Ebonyi State under the BHCPF using a mixed-methods approach. Specifically, it examined the effects of essential drug availability, healthcare workforce adequacy, and BHCPF implementation on perceived service quality and patient satisfaction. By generating subnational evidence, the study contributes to the growing body of literature on PHC financing reforms in Nigeria and provides policy-relevant insights for strengthening PHC systems in similar contexts.<sup>11,12,17</sup>

## Materials and Methods

### Study design

A cross-sectional survey design was employed.

### Setting

#### *Study area and socio-demographic context of Ebonyi State*

Ebonyi State is one of the five states in south-eastern Nigeria, with an estimated population of over 3 million people, the majority of whom reside in rural communities. The state comprises 13 Local Government Areas (LGAs) and is characterised by agrarian livelihoods, low average household income, and limited access to social services. Health indicators in the state mirror national challenges, including high maternal and under-five mortality rates and a significant burden of preventable diseases.

### Sampling

Forty facilities were proportionately selected from the 180 BHCPF-supported PHC facilities in Ebonyi State (implementation commenced 2019) and 5 staff per facility who must have worked for at least a year were randomly selected to have 200 health workers. These workers consisted of nurses, midwives, community health officers, and community health extension workers and doctors. A 5-point Likert scale; domain score equaled the mean of items and interpretation thresholds were defined with higher numbers meaning higher scores on each domain.

### Qualitative aspect

Eight Key In-depth Interviews (KIIs) (5 facility managers randomly drawn and also 3 LGA coordinators) were analysed using thematic analysis. The qualitative aspect was based on the STROBE recommendations for observational studies to allow triangulation of findings and enhance interpretive validity (Table 1).

### Sample size and sampling technique

Data were collected using a structured questionnaire covering infrastructure functionality, availability of essential drugs, staffing adequacy, service utilisation, and BHCPF implementation. The instrument demonstrated strong validity (Content Validity Index 0.87) and reliability (Cronbach's alpha 0.89).

### Data analysis

Quantitative data were analysed using descriptive statistics, Being a normal distribution Pearson correlation(Shapiro–Wilk), multiple linear regression, and logistic regression models adjusted for covariates. Complete-case analysis was used. Diagnostic tests confirmed normality, absence of multicollinearity, and homoscedasticity.

### Ethical considerations

Ethical approval Ethical approval for the study was obtained from the David Umahi Federal University of Health Sciences Research Ethics Committee (DUFUHS/UREC/2023/0001). The documentation included a participant information sheet and full informed consent form. The participants were made to understand that they could withdraw from the study any time without consequences. There were plans to counsel or refer those distressed after a prolonged waiting. The participants were assured of minimal risks in the study and Community Health workers and leaders were oriented to ensure they not put force on participants since they were seen as authority figures. Ebonyi State includes rural communities with low literacy. The study used oral explanation scripts, impartial witnesses for illiterate participants and also the translation of consent materials into Igbo language.

**Table 1.** Reliability of the quantitative study instrument.

Construct/variable	Number of items	Cronbach's alpha ( $\alpha$ )	Reliability status
Infrastructure functionality	8	0.83	Reliable
Drug and medical supply availability	6	0.81	Reliable
Staffing and human resources	7	0.87	Highly reliable
Service utilisation and efficiency	5	0.79	Reliable
Financial and BHCPF implementation	6	0.85	Highly reliable
Overall instrument	32	0.84	Reliable

BHCPF, Basic Healthcare Provision Fund.

## Results

### Response rate and data quality

A total of 212 questionnaires were distributed and 200 were valid for analysis, yielding a response rate of 94.3%.

A total of 200 primary healthcare workers participated in the study. Females constituted a slight majority of respondents (54.0%), while males accounted for 46.0%. The age distribution showed that most participants were within the economically active workforce, with the largest proportion aged 30-39 years (39.0%), followed by those aged 40-49 years (27.0%). Younger respondents aged 20-29 years represented 23.0%, whereas participants aged 50 years and above constituted the smallest group (11.0%).

Regarding educational attainment, over half of the respondents possessed a bachelor's degree (52.0%), while nearly one-third had postgraduate qualifications (29.0%). Participants with diploma or certificate qualifications accounted for 19.0%, indicating a relatively high overall educational profile among the workforce.

In terms of professional roles within primary healthcare facilities, medical staff, including doctors and nurses, formed the largest category (48.0%). Support and technical staff comprised 32.0% of the respondents, whereas facility managers represented 20.0%. With respect to work experience, the majority of participants had between 6 and 10 years of professional experience (41.0%). Those with 11 years or more of experience constituted 30.0%, while respondents with 1-5 years of experience accounted for 29.0%, reflecting a balanced distribution between early-career and more experienced healthcare workers. Workforce adequacy ( $\beta=0.42$ ;  $p<0.001$ ) and essential drug availability ( $\beta=0.35$ ;  $p<0.001$ ) were independently associated with perceived quality. Staff-reported patient satisfaction was associated with workforce adequacy (Odds Ratio, OR=2.50), essential drug availability (OR=2.10), and BHCPF implementation effectiveness (OR=1.60). Pearson correla-

tion justified by normal distribution based on Shapiro–Wilk test which gave  $p=0.081$ . Since  $0.05<0.081$  normality was confirmed and use of Pearson correlation justified.

## Discussion

The discussion was grounded on evidence showing that availability of essential drugs, adequacy of the healthcare workforce, and effective BHCPF implementation were the primary and statistically significant drivers of perceived quality and patient satisfaction in PHC facilities, whereas infrastructure alone was insufficient when these factors were controlled for (Table 2). The findings of this study provide important insights into the functionality of primary healthcare services in Ebonyi State under the Basic Healthcare Provision Fund. Overall, PHC facilities demonstrated moderate functionality, with notable improvements in essential drug availability, workforce adequacy, and perceived quality of care. These findings suggest that the BHCPF has begun to fulfil its intended role as a catalytic financing mechanism for PHC strengthening, consistent with national policy expectations and global PHC reform agendas.<sup>5,7,15</sup> Availability of essential drugs emerged as a strong predictor of both perceived quality and patient satisfaction. This aligns with evidence from Nigeria and other LMICs indicating that medicine availability is a key determinant of service utilisation and trust in PHC facilities.<sup>11,12,18</sup> Drug stock-outs have historically driven patients towards informal providers and secondary facilities, undermining PHC gatekeeping functions.<sup>19,20</sup> Tables 3 to 5 shows that the positive association observed in this study underscores the importance of strengthening BHCPF-supported drug supply chains, logistics management, and accountability mechanisms to ensure uninterrupted access to essential medicines.<sup>5,11</sup> Also Tables 3 to 5 show that the healthcare

**Table 2.** Overall functionality of the Primary Healthcare Centres (PHC). Overall PHC functionality under the Basic Healthcare Provision Fund (BHCPF) was moderate across facilities, with mean domain scores ranging from 3.42 to 3.76.

Construct / variable	Mean (M)	SD	Interpretation
Infrastructure functionality	3.68	0.84	Moderately functional
Drug and medical supply availability	3.42	0.91	Fairly adequate
Staffing and human resources	3.76	0.87	Adequate but with gaps
Service utilisation and efficiency	3.55	0.79	Moderate utilisation
Financial and BHCPF implementation	3.61	0.88	Fairly effective

SD, Standard Deviation

**Table 3.** Demonstration of the linkages among the main primary healthcare functionality domains. Results shows moderate positive correlations between drug availability and perceived quality ( $r=0.52$ ;  $p<0.001$ ) as well as Basic Healthcare Provision Fund (BHCPF) implementation effectiveness ( $r=0.38$ ;  $p<0.001$ ).

	PQ	AED	HWA	INSF	BHCPF
PQ	1.00				
AED	0.52*	1.00			
HWA	0.60*	0.45*	1.00		
INSF	0.48*	0.40*	0.46*	1.00	
BHCPF	0.45*	0.38*	0.42*	0.35*	1.00

\* $p<0.001$  for all shown correlations. PQ, Perceived Quality; AED, Availability of Essential Drugs; HWA, Healthcare Workforce Adequacy; INSF, Infrastructure Functionality; BHCPF, Basic Healthcare Provision Fund implementation

workforce adequacy was another significant determinant of service quality and satisfaction. Facilities with sufficient and appropriately trained personnel reported better service delivery outcomes, reduced waiting times, and improved patient experiences. Human resources remain a critical bottleneck in PHC systems, and the findings reinforce calls for sustained investment in recruitment, retention, and capacity building of PHC workers.<sup>12,16,21</sup> Comparable studies in Nigeria have highlighted workforce shortages and maldistribution as persistent challenges despite financing reforms, particularly in rural settings.<sup>11,12</sup> Interestingly, infrastructure functionality (Tables 4 and 5) did not independently predict perceived quality after adjustment for other factors. This finding suggests that while infrastructure is necessary, it may not be sufficient to influence patient perceptions in the absence of medicines and staff. Similar observations have been reported in health systems research, where ‘software’ components such as human resources, financing flows, and service processes often outweigh ‘hardware’ investments in shaping user experiences and satisfaction.<sup>22-24</sup> The positive effect of BHCPF implementation on service outcomes highlights the importance of predictable financing and strengthened governance structures at PHC level. However, qualitative insights revealed operational challenges, including delayed fund disbursement, administrative bottlenecks, and variable managerial capacity, which may threaten sustainability. These findings mirror reports from other Nigerian states where implementation challenges have moderated the impact of BHCPF intervention.<sup>25</sup> From a policy perspective, the study reinforces the relevance of the BHCPF as a cornerstone of Nigeria’s PHC revitalisation agenda and UHC pathway.<sup>26</sup> Nevertheless, equitable scale-up, integration with broader health system reforms, and continuous performance monitoring are required to ensure that gains are sustained and extended to all PHC facilities.<sup>27,28</sup> Strengthening community accountability mechanisms, improving data use for decision-making,

and ensuring timely release of funds will be critical to consolidating BHCPF gains. Future research should adopt longitudinal and mixed-methods designs to explore long-term health outcomes associated with BHCPF implementation, including maternal and child health indicators, financial risk protection, and equity impacts. Such evidence will be vital for informing national scale-up strategies and optimising PHC financing reforms in Nigeria and comparable LMIC contexts.<sup>11,29</sup>

The qualitative component of the study provided important contextual insights, revealing that systemic challenges in the implementation of the BHCPF. These findings are consistent with previous studies identifying weak workforce, misaligned financing framework and poor supply chains as persistent barriers to effective implementation of the scheme. The integration of qualitative data therefore strengthened the interpretation of quantitative findings and allowed for a more comprehensive understanding of the implementation of BHCPF in Ebonyi State.

### Study limitations

First the study was conducted exclusively in BHCPF-supported PHCs within Ebonyi State. Facilities not enrolled in the BHCPF were not included, and contextual factors specific to Ebonyi State may limit external generalisability to other Nigerian states or LMIC settings with different implementation maturity levels.

Second, although a qualitative component was included to enhance interpretive validity, the number of key informant interviews was modest. While thematic consistency was observed, broader qualitative sampling may have provided deeper contextual insights into implementation dynamics.

These limitations notwithstanding, the study provides important subnational evidence linking BHCPF implementation domains with functionality indicators and contributes to the policy discourse on PHC financing reforms in Nigeria.

**Table 4.** Determinants of perceived quality of care. Facilities with higher essential drug availability demonstrated significantly higher perceived quality scores ( $\beta=0.35$ ;  $p<0.001$ ) and more than twice the odds of patient satisfaction (OR=2.10; 95% CI: 1.60-2.75).

Predictor	Coeff ( $\beta$ )	SE	t	p	95% CI
(Intercept)	1.20	0.18	6.67	<0.001	0.85, 1.55
AED	0.35	0.06	5.83	<0.001	0.23, 0.47
HWA	0.42	0.07	6.00	<0.001	0.28, 0.56
INSF	0.10	0.06	1.67	0.096	-0.02, 0.22
BHCPF	0.15	0.06	2.50	0.013	0.03, 0.27
Age (per year)	0.01	0.003	2.00	0.046	0.0001, 0.02
Gender (female=1)	0.03	0.05	0.60	0.55	-0.07, 0.13

$R^2=0.56$ ; Adjusted  $R^2=0.54$ ;  $F(6,193)=40.8$ ;  $p<0.00$ .

**Table 5.** Determinants of patient satisfaction. Facilities with higher essential drug availability demonstrated significantly higher perceived quality scores ( $\beta=0.35$ ;  $p<0.001$ ) and more than twice the odds of patient satisfaction (OR=2.10; 95% CI: 1.60-2.75).

Predictor	OR	95% CI	p
AED (per unit)	2.10	1.60-2.75	<0.001
HWA (per unit)	2.50	1.85-3.36	<0.001
BHCPF (per unit)	1.60	1.03-2.50	0.035
Infrastructure (per unit)	1.25	0.95-1.65	0.11
Medical staff (ref = manager)	0.85	0.45-1.60	0.60

Nagelkerke pseudo- $R^2=0.41$ ; Hosmer–Lemeshow  $p=0.45$  (good fit). AED, Availability of Essential Drugs; HWA, Healthcare Workforce Adequacy; BHCPF, Basic Healthcare Provision Fund implementation.

**Table 6.** Diagnostic robustness of the statistical tests deployed in results analysis.

Diagnostic test	Purpose	Indicator	Result/value	Interpretation
Content Validity Index (CVI)	Questionnaire items measure constructs appropriately	CVI score	0.87	Valid
Reliability (Cronbach's alpha)	Internal consistency	$\alpha$	0.84	Reliable
Normality (Shapiro-Wilk)	Normality of continuous variables	W, p	W=0.972; p=0.081	Normal
Multicollinearity (VIF)	Correlation among predictors	Mean VIF (range)	1.72 (1.21-2.34)	Acceptable
Homoscedasticity (Breusch-Pagan)	Equal variance of residuals	$\chi^2$ , p	$\chi^2(1)=2.18$ ; p=0.14	Homoscedastic
Response rate	Adequacy of data collection	196/212×100	92.5%	Acceptable

VIF, Variance Inflation Factor.

## Conclusions

These findings formed the empirical basis for the Discussion's focus on drug supply, workforce sufficiency, and sustainable financing as priority levers for PHC improvement in Ebonyi State. The statistical robustness of the findings showed a normal distribution, no multicollinearity, homoscedastic residuals and strong content validity (Table 1, Table 6). The BHCPF has contributed positively to the functionality of primary healthcare services in Ebonyi State, particularly through improved drug availability and workforce support. While PHC facilities demonstrate moderate functionality, addressing operational challenges and strengthening accountability will be essential for consolidating gains and advancing UHC.

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