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Assessment of Structural and Socio-economic Determinants of Primary Health Care Accessibility in Taraba State Nigeria

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ABSTRACT

Primary Health Care (PHC) is the cornerstone of equitable health systems, yet access remains uneven in Nigeria due to both structural and socio-economic constraints. This study assessed determinants of PHC accessibility in Taraba State, a region characterized by diverse geography and socio-economic conditions. Using a cross-sectional design, data were collected from eight Local Government Areas (LGAs) through household surveys, key informant interviews, and facility records, complemented by GIS mapping. Findings revealed marked disparities in utilization: while facilities such as Zing and Yorro achieved high outpatient attendance and full catchment coverage, others like Bali and Sardauna recorded low utilization despite wide coverage, underscoring the role of socio-economic barriers. Structural challenges, including poor roads, difficult terrain, long distances, and inadequate transport, were found to be systemic, affecting populations broadly across socio-demographics. Socio-economic determinants such as income, education, and occupation further influenced health-seeking behavior, with affordability and opportunity costs suppressing utilization even where facilities were physically accessible. The study concludes that PHC inequities in Taraba are multidimensional, shaped by the interaction of geographic constraints and socio-economic realities. It recommends expanding PHC services, improving rural transport, addressing affordability barriers, and strengthening community engagement to ensure equitable access and progress toward universal health coverage.

Keywords: Health care accessibility, Primary Health Care, Structural determinants, Socio-economic factors & Taraba State.

Introduction

Primary health care (PHC) is globally recognized as the foundation of effective and equitable health systems, designed to provide essential services such as maternal and child health, immunization, disease prevention, and health promotion close to the community [1]. In Nigeria, the PHC system was established to bring healthcare within the reach of rural and underserved populations, yet accessibility and utilization remain constrained by both structural and socio-economic factors. Evidence from different states demonstrates that these barriers persist even when facilities are available. For example, in Plateau State, high costs of drugs (29%), reliance on traditional healers (39%), transportation challenges (30%), and service charges (19%) discouraged mothers from using PHC services [2]. Similarly, in Anambra State, routine immunization, although officially free, was less accessible to low socio-economic households due to indirect costs and distance to facilities [3]. These findings highlight that accessibility is not determined solely by the physical presence of health facilities but also by financial affordability and socio-economic realities.

Persistent inequalities in healthcare utilization across Nigeria are well-documented. Studies show that women from wealthier households and urban areas are far more likely to access antenatal and maternal care services compared to poorer, rural women, revealing wide gaps in equity [4, 5]. Indeed, socio-economic status, education, and occupation remain strong predictors of healthcare-seeking behavior across the country [6]. These inequities exacerbate Nigeria's poor health outcomes, where maternal mortality stands at 512 deaths per 100,000 live births and under-five mortality remains at 117 per 1,000 live

births [7]. Such statistics underscore the urgency of addressing both structural and socio-economic determinants of PHC access.

Within this national context, Taraba State presents a particularly compelling case. The state's mix of urban centers, semi-urban areas, and dispersed rural settlements creates significant variation in healthcare access. A recent study found that the availability of healthcare and laboratory services significantly reduced mortality among rural households in Taraba, but paradoxically, utilization of maternal and child health services was associated with increased mortality, indicating that service availability does not necessarily translate into improved outcomes [8]. Another study in Kurmi Local Government Area of Taraba State reported that income, education, occupation, and distance significantly influenced the accessibility of PHC services for child health management [9]. These findings not only echo national patterns of inequity but also emphasize the need for localized analysis of structural and socio-economic barriers in Taraba.

Despite the critical importance of PHC to health system performance, few studies have systematically examined how structural determinants such as facility distribution, distance, and transport interact with socio-economic variables like income, education, occupation, gender, and age to shape PHC accessibility in Taraba State. This gap limits the ability of policymakers to design interventions tailored to the state's diverse population and settlement patterns. It also risks perpetuating generic policy responses that fail to address local realities.

This study therefore seeks to assess the structural and socio-economic determinants of primary healthcare accessibility in Taraba State, Nigeria. Specifically, it investigates how physical accessibility and socio-economic conditions jointly influence healthcare utilization across different local government areas and aims to generate evidence-based recommendations to guide equitable health planning. By integrating these perspectives, the study contributes to bridging the evidence gap on localized healthcare access in northeastern Nigeria and supports ongoing efforts to strengthen PHC as the cornerstone of universal health coverage.

Description of Study Area

This study was carried out in Taraba State, Northeastern Nigeria, a region with diverse geography and socio-economic conditions that strongly influence health service delivery and accessibility. Taraba lies between latitude 6°25′N and 9°30′N, and longitude 9°30′E and 11°45′E (fig. 1), covering a total land area of about 54,473 km², making it one of the largest states in Nigeria by size [10]. It shares international borders with Cameroon to the east and is bounded by Adamawa, Benue, Gombe, Nasarawa, and Plateau States.
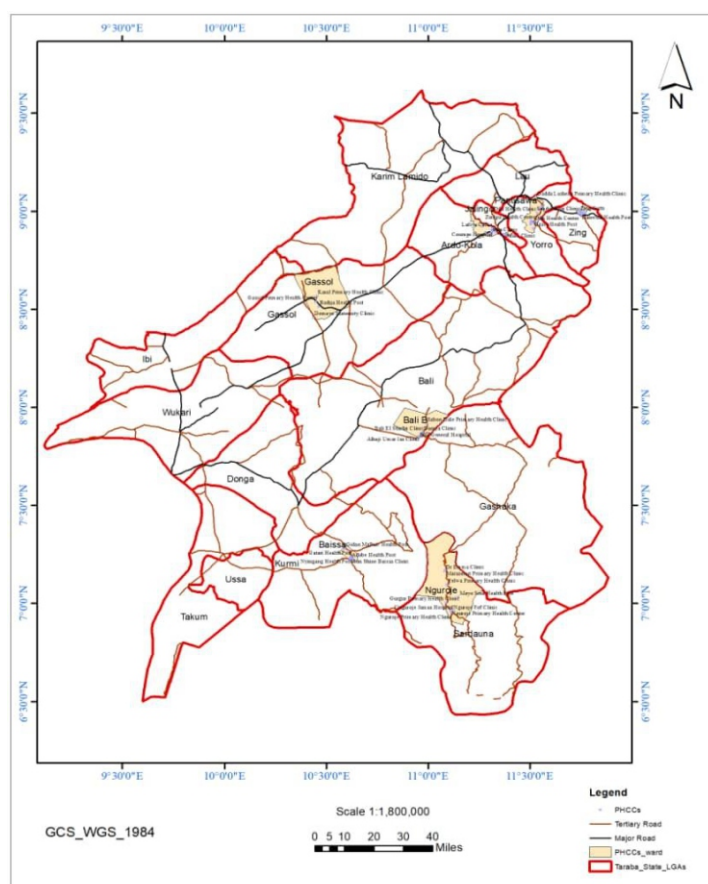

Fig. 1. Map of Taraba State Showing the Sampled Sites

According to the 2006 Population and Housing Census, the state had a population of about 2.3 million people, projected to exceed 3.6 million by 2022. The population is unevenly distributed, with most residents living in rural areas and engaged in farming, trading, and small-scale occupations [10]. Taraba is also known for its ethnic diversity, with more than 80 distinct ethnic groups, including the Jukun, Mambilla, Kuteb, Chamba, Tiv, and Fulani. Geographically, the state exhibits remarkable diversity. The Mambilla Plateau in Sardauna Local Government Area rises to over 1,800 meters above sea level, creating difficult terrain and unique access challenges for rural communities.

In contrast, the lowland areas along the Benue River and its tributaries are prone to flooding, which further disrupts access to health facilities during rainy seasons [5]. This geographic variation contributes to disparities in Primary Health Care (PHC) accessibility across the state.

Health care delivery in Taraba is organized under the Primary Health Care Under One Roof (PHCUOR) framework. Despite the presence of numerous PHCs across its LGAs, the state faces major challenges in ensuring equitable access. These include poor road infrastructure, long travel distances, difficult terrain, and socio-economic barriers such as poverty and limited health insurance coverage [1, 11]. These factors make Taraba State a critical context for examining the structural and socio-economic determinants of PHC accessibility.

Methodology

Research Design

This study employed a cross-sectional survey design to assess the structural and socio-economic determinants of primary health care (PHC) accessibility in Taraba State, Nigeria. A cross-sectional approach was appropriate as it enabled the collection of data at a single point in time across multiple communities, allowing for the identification of associations between determinants and health service utilization [12]. Such designs are widely used in health services research because they are cost-effective, provide timely results, and facilitate comparisons across population subgroups [13].

Sampling Procedure

Taraba State has 16 Local Government Areas (LGAs). From these, 8 LGAs were selected using a probabilistic method of simple random sampling, with stratification based on routine immunization registers to capture areas with high and low population densities. This ensured representativeness and minimized bias in LGA selection [14]. The selected LGAs were Bali, Zing, Gassol, Sardauna, Jalingo, Ardo-Kola, Yorro, and Kurmi.

Within each LGA, one major government-owned PHC was purposively selected. Selection criteria included: (i) the facility with the highest patronage and client density in the LGA; (ii) strategic centrality within the LGA; (iii) its function as the primary catchment facility serving surrounding communities; and (iv) absence of severe security challenges. This purposive approach is consistent with recommendations in implementation research where high-volume sites can yield richer insights into population-level dynamics [15]. In total, eight PHCs were included in the study.

Data Collection Instruments and Tools

Three complementary data sources were used:

I. Structured Questionnaires – Administered to household respondents to collect information on socio-demographic characteristics (e.g., age, gender, income, education, occupation), health-seeking behaviors, and perceived barriers to PHC access.

ii. Key Informant Interviews (KIIs) – Conducted with PHC staff, ward development committee members, and community leaders to provide qualitative insights on structural challenges, facility capacity, and socio-economic dynamics.

iii. Facility Records – Data from outpatient registers, routine immunization records, and monthly attendance reports were extracted to triangulate and validate community-reported utilization patterns.

To complement quantitative data, Geographic Information System (GIS) tools were used. ArcGIS 10.8 software [16] enabled mapping of facility catchment areas, estimation of travel distances, and spatial visualization of disparities in PHC accessibility.

Validity and Reliability of Instruments

To ensure content validity, the questionnaire was developed after a review of existing literature on PHC access in Nigeria and Africa, and aligned with validated instruments used in national surveys such as the Nigeria Demographic and Health Survey (NDHS) [10]. The draft questionnaire was reviewed by public health experts and PHC managers to confirm the relevance, clarity, and comprehensiveness of items.

The instrument was pretested in Takum LGA (not included in the final study sample) with 30 respondents. Feedback from the pilot was used to refine question wording, adjust sequencing, and remove ambiguities. Pretesting is an essential step to enhance face validity and cultural appropriateness of survey instruments [17].

Reliability was assessed through internal consistency testing. Responses from the pilot were analyzed using Cronbach's alpha, with a threshold of 0.70 or higher considered acceptable for internal consistency [18]. In addition, for qualitative interviews, inter-coder reliability checks were performed: two independent coders analyzed the same set of transcripts, and discrepancies were reconciled through consensus. This enhanced the dependability of qualitative findings [19].

Data Collection Procedures

Data were collected by trained field enumerators who were fluent in English and local languages. Prior to fieldwork, enumerators underwent a 3-day training on research ethics, administration of questionnaires, interview techniques, and use of GPS devices for geospatial mapping. Data collection lasted six weeks and was supervised daily to ensure adherence to protocols.

Data Analysis

Quantitative data were entered and analyzed using SPSS version 25. Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed to summarize socio-demographic characteristics and service utilization. Chi-square tests assessed associations between socio-economic variables and perceived barriers to PHC access. Binary logistic regression models were constructed to identify predictors of PHC utilization, adjusting for confounders.

Qualitative interview transcripts were thematically analyzed using NVivo 12, allowing identification of patterns and narratives on structural and socio-economic barriers. To integrate findings, results from qualitative and quantitative strands were triangulated, ensuring robustness through methodological convergence [19]. GIS analysis supplemented statistical results by illustrating spatial inequalities in facility distribution and access, thereby linking quantitative indicators with geographic context.

Ethical Considerations

Ethical approval for the study was obtained from the Taraba State Ministry of Health. Informed consent was obtained from all participants before data collection, with respondents assured of confidentiality, voluntary participation, and the right to withdraw at any stage without consequences. For illiterate participants, consent was obtained via thumbprint with a literate witness present, consistent with ethical standards in community-based research. Data were anonymized and stored securely, and all electronic files were password-protected. To minimize risk, data collection avoided sensitive identifiers, and interviews were conducted in private settings. These measures align with the principles of respect for persons, beneficence, and justice enshrined in the Declaration of Helsinki [20].

Limitations

The study has certain methodological limitations. First, the cross-sectional design restricts causal inference, as observed associations cannot establish temporal relationships between determinants and healthcare utilization [13]. Second, data obtained from questionnaires relied partly on self-reports, which is subject to recall bias and social desirability bias, particularly for sensitive socio-economic information. Third, while purposive selection of major PHCs ensured representation of high-volume facilities, it may have excluded smaller facilities where access challenges are more severe, thereby potentially underestimating barriers in remote areas. Fourth, security concerns in some communities limited the geographical scope of data collection, which may affect the generalizability of findings to the entire state. Despite these limitations, triangulation of quantitative, qualitative, and GIS data improved the robustness and credibility of results.

Results and Discussion
Patterns of Primary Health Care Accessibility

The analysis of determinants of health care accessibility (Table 1) shows wide disparities in Primary Health Care (PHC) utilization across the eight selected Local Government Areas (LGAs) of Taraba State. Jalingo PHC, with the largest catchment population (20,956), recorded relatively high outpatient attendance (720 monthly; 34.36 per 1,000) but only 62.5% village coverage. This reflects structural bottlenecks such as overcrowding and distance to peripheral villages. In contrast, Zing PHC achieved 100% catchment coverage and high utilization (400 monthly; 44.44 per 1,000), demonstrating the importance of proximity, functionality, and strong community integration.

Table 1. Patterns of Primary Health Care Accessibility in Taraba State

LGA	Ward	Settlement	Catchment Villages (No.)	Catchment Population	Monthly OPD Attendance	Average OPD attendance per 1000	Villages Actually Accessing Facility	% Coverage of Catchment Villages
Jalingo	Turaki-A	Turaki-A Model	24	20,956	720	34.36	5	62.5%
Bali	Bali-B	Angwan Kundi	10	5,028	22	4.38	9	90%
Ardo-Kola	Jouro-Nyinu	St. Peters	4	6,243	35	5.61	4	100%
Gassol	Gassol	Police station	34	18,364	585	31.85	12	35.2%
Yorro	Pantisawa	Danshongbong	13	7,865	500	63.59	8	61.5%
Kurmi	Baissa	Angwan Model	11	10,529	249	23.65	11	100%
Sarduana	Nguroje	Tike Quarters	13	12,835	178	13.87	5	38.46%
Zing	Zing AI	Angwan Yandan	20	9,000	400	44.44	20	100%

Source: Fieldwork, 2025

Some facilities with large catchment populations, such as Gassol (18,364 people, 31.85 per 1,000 OPD, 35.2% coverage) and Sardauna (12,835 people, 13.87 per 1,000 OPD, 38.46% coverage), exhibited underutilization, pointing to geographic barriers, poor transport infrastructure, and difficult terrain. On the other hand, Ardo-Kola and Kurmi PHCs reported full catchment coverage (100%), yet service utilization remained modest, suggesting socio-economic barriers such as affordability, opportunity costs of care, and preference for traditional alternatives. Bali PHC further illustrates this paradox, with high coverage (90%) but extremely low OPD attendance (22 monthly; 4.38 per 1,000), underscoring the weight of socio-cultural and economic determinants in shaping health-seeking behavior.

Interestingly, Yorro PHC achieved the highest OPD rate per 1,000 population (63.59) despite covering only 61.5% of villages. This suggests that community trust, disease burden, and absence of alternatives can sometimes override structural constraints. Collectively, these findings affirm that PHC accessibility in Taraba is influenced by a dynamic interplay of structural determinants (facility distribution, distance, transport, terrain) and socio-economic determinants (costs, health beliefs, cultural practices), consistent with national and global evidence [1, 6 & 10].

Barriers to PHC Accessibility
Transport Limitations
Table 2 highlights that lack of transport was reported equally by men and women (50% each) and across occupations, but with no significant association to socio-demographic categories (p > 0.05). This demonstrates that transportation barriers are systemic structural constraints rather than socio-demographic ones. In rural Taraba, reliance on motorcycles and irregular public transport, compounded by poverty, means that transport inadequacies affect all groups uniformly. This aligns with Okoli [5], who reported that poor transport systems are a major obstacle to rural PHC utilization in Nigeria.

Table 2. Barrier to accessibility to PHC (No means of Transportation)

Barrier	Socio-Demography	Category	N (%)	Chi-Square (x^2)	df	p-value
No means of transport	Gender	Male	1(50)	.036	1	.849
		Female	1(50)			
	Age Group	18-30	0(0)	1.306	3	.728
		31-40	1(50)			
		41-50	0(0)			
		51-60	1(50)			
	Primary Occupation	Farming	1(50)	3.200	2	.202
		Civil Service	1(50)			
		Petty Trader	0(0)			

Source: Fieldwork, 2025

Distance to Facilities
Table 3 shows that distance emerged as a statistically significant barrier by age group (p = 0.034), disproportionately affecting younger adults (18–40 years). These groups are more economically active, and long distances discourage routine visits except in emergencies. While not significant, women and rural occupations (farmers, petty traders) reported higher challenges, reflecting settlement patterns and gendered health-seeking demands. This confirms the "distance decay" phenomenon, where service utilization drops sharply as distance to facilities increases [10].

Table 3. Barrier to accessibility to PHC (Distance)

Barrier	Socio-Demography	Category	N (%)	Chi-Square (x^2)	df	p-value
Distance	Gender	Male	2(33.3)	2.049	1	.152
		Female	4(66.7)			
	Age Group	18-30	2(33.3)	8.686	3	.034
		31-40	4(66.7)			
		41-50	0(0)			
		51-60	0(0)			
	Primary Occupation	Farming	4(40)	1.493	2	.474
		Civil Service	0(0)			
		Petty Trader	2(50)			

Source: Fieldwork, 2025

Poor Road Conditions
As Table 4 indicates, bad roads were reported by both men (22.2%) and women (28.6%), with no significant association across socio-demographics (p > 0.05). Farmers and civil servants were particularly affected, while petty traders reported none. This suggests that poor road infrastructure is a universal constraint, especially in rural LGAs where unpaved roads become impassable during rainy seasons. Poor road conditions extend travel time, delay care-seeking, and limit outreach coverage, reinforcing inequities in service delivery [5].

Table 4. Barrier to accessibility to PHC (poor road)

Barrier	Socio-Demography	Category	N (%)	Chi-Square (x²)	df	p-value
Poor Road	Gender	Male	2(22.2)	.085	1	.771
		Female	2(28.6)			
	Age Group	18-30	0(0)	2.857	3	.414
		31-40	3(42.8)			
		41-50	0(0)			
		51-60	1(25)			
	Primary Occupation	Farming	3(30)	2.133	2	.344
		Civil Service	1(50)			
		Petty Trader	0(0)			

Source: Fieldwork, 2025

Difficult Terrain

Table 5 demonstrates that terrain challenges, though not statistically significant, were reported most by women, adults aged 31–40, and farmers. This reflects settlement realities in mountainous LGAs like Sardauna and Kurmi, where steep hills, rivers, and rugged landscapes impede physical access. Unlike transport or road barriers, which may be mitigated through infrastructure investment, terrain barriers are location-specific and persistent, requiring context-sensitive solutions such as mobile outreach, community health workers, and strategically located satellite PHCs.

Table 5. Barrier to accessibility to PHC (Difficult Terrain)

Barrier	Socio-Demography	Category	N (%)	Chi-Square (x²)	df	p-value
Difficult terrain	Gender	Male	1(11.11)	.788	1	.550
		Female	2(28.5)			
	Age Group	18-30	0(0)	4.747	3	.191
		31-40	3(42.8)			
		41-50	0(0)			
		51-60	0(0)			
	Primary Occupation	Farming	3(30)	2.215	2	.330
		Civil Service	0(0)			
		Petty Trader	0(0)			

Source: Fieldwork, 2025

Comparative Insights

Synthesizing the findings from Tables 1–5 reveals distinct but interrelated patterns of accessibility barriers. Transport limitations (Table 2) and poor roads (Table 4) emerged as systemic barriers, affecting populations broadly across socio-demographics. Distance (Table 3) had a selective impact, particularly on younger adults and rural occupations, while difficult terrain (Table 5) disproportionately affected farmers and mountainous settlements.

These results confirm that structural determinants are the primary constraints to PHC accessibility in Taraba State, cutting across gender and socio-economic divides, while socio-economic determinants modulate the extent of service utilization even where physical access is achieved. The evidence reinforces global understanding that equitable access to PHC requires addressing both supply-side barriers (infrastructure, geography, facility distribution) and demand-side barriers (affordability, awareness, cultural acceptability) [1].

Policy Implications

Improving PHC accessibility in Taraba State requires a dual strategy. On the structural side, expanding rural road networks, providing reliable transport solutions (e.g., community ambulances), and deploying satellite or mobile PHCs in hard-to-reach areas can significantly reduce geographic inequities. On the socio-economic side, subsidizing essential services, strengthening health education, and fostering community trust in PHCs are critical to improving utilization. Lessons from facilities like Zing and Yorro, where both coverage and utilization are strong, can inform models for scaling up effective PHC delivery in similar contexts.

Conclusion

This study assessed the structural and socio-economic determinants of Primary Health Care (PHC) accessibility in Taraba State, Nigeria, across eight Local Government Areas. The findings demonstrate that accessibility is shaped by a complex interplay of structural barriers, including distance, transportation, poor road networks, and difficult terrain, and socio-economic factors, such as affordability, cultural practices, and health-seeking behavior. While facilities like Zing and Yorro PHCs achieved high coverage and utilization, others, such as Gassol, Sardauna, and Bali, revealed significant access gaps. Transport and road challenges emerged as systemic barriers, cutting across all demographics, while distance and terrain disproportionately affected rural populations, farmers, and economically active age groups. Moreover, even where structural accessibility was strong, socio-economic barriers suppressed utilization, as observed in Kurmi and Bali. Overall, the study confirms that PHC inequities in Taraba are multidimensional: geographic and infrastructural constraints intersect with socio-economic realities to determine whether populations can access and use essential services.

Recommendations

Based on the findings of the study, the following recommendations are made;

I. Expand and Decentralize PHC Services: New PHCs and satellite facilities should be established in underserved rural and mountainous areas, while mobile health teams and community health workers can extend services to hard-to-reach settlements.

ii. Improve Rural Transport and Road Infrastructure: Upgrading rural roads, particularly in LGAs such as Sardauna and Kurmi, and introducing community-based transport options (e.g., tricycle ambulances, subsidized motorcycles) will ease both emergency and routine access to PHCs.

iii. Address Socio-economic Barriers: Subsidizing essential services, especially maternal and child health, and implementing community health insurance schemes will reduce out-of-pocket costs and enhance affordability for low-income households.

iv. Strengthen Community Engagement and Trust in PHCs: Expanding health education and involving community leaders in PHC governance will address misconceptions, promote preventive health-seeking behaviors, and improve accountability.

v. Adopt Integrated Policy Approaches: Aligning health investments with rural development priorities such as roads, transport, and poverty reduction, while using facility-level data for planning, will ensure equitable and evidence-based health service delivery.

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