

Assessing HIV Care Services in Nigeria: A Comparative Study of the North-East and South-South regions of Nigeria

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Abstract

This study conducted a comparative case study analysis of the HIV program in Nigeria's South-South and North-East regions of Nigeria to determine the access and quality of HIV care and treatment services. Service delivery is an essential component of the WHO Health systems framework. Data were collected from 385 respondents using structured questionnaires and analysed using descriptive and inferential statistics. The study found that the North-East region of Nigeria had significantly lower numbers of primary healthcare facilities and inpatient beds per 10,000 population compared to the South-South region. The North-East region had an average of 0.02 inpatient beds per 1,000 population, significantly below the WHO standard, while the South-South region had an average of 0.18 inpatient beds per 1,000 population, relatively closer to the WHO standard. The general service readiness score for delivering HIV program services was at least 94% in all health facilities in both the North-East and South-South regions. The HIV service readiness index for the North-East region was higher than that of the South-South region, with some disparities in the availability of national ART guidelines, national HIV counselling and testing guidelines, staff training, and availability of HIV prevention services. HIV testing and counselling services were described as readily available and accessible in both regions, with some communities taking ownership of promoting the availability of these services. However, both regions had a relatively high service readiness score for delivering HIV program services, with some disparities in the availability of national guidelines and training of staff. These findings demonstrate extensive investment of government and donor agencies in delivering quality HIV services with areas to improve to ensure alignment with WHO system strengthening framework.

Keywords: Health systems, HIV, North-East, Service delivery, South-South, WHO.

Introduction

The World Health Organization (WHO) published a health system building blocks framework in 2007 with the intention of fostering a common understanding of what a health system is and what constitutes its strengthening. A health system is conceptualized in the framework as consisting of six building blocks: service delivery, health workforce, information, medical products, vaccines, and

technologies, financing, and leadership and governance, with an overall outcome of improved health, responsiveness, social and financial risk protection, and improved efficiency [1]. The World Health Organization (WHO) has emphasized that quality health service delivery is a right and health system strengthening is the way to provide that effective and affordable care to the population.

Utilizing the HIV care as a model, the service delivery methods were divided into three levels

of differentiated approaches, including differentiated screening and HIV testing, differentiated treatment and care, and differentiated drug delivery. By considering the diversity in client characteristics and highlighting the observed practices and their results, the service delivery aim to enhance access and options for HIV testing and treatment [2]. Service Delivery is crucial for improving care since it makes sure that people can obtain healthcare services [3]. A public health approach to HIV treatment and care has been encouraged by WHO to facilitate the widespread distribution of antiretroviral therapy. The service delivery approach prioritizes tactics like task sharing, decentralization and amalgamation of HIV services with other public health programs, patient and community empowerment, and recognition of the critical importance of efficient, consistent approaches to scaling up HIV services in settings with limited resources. The public health approach likewise strongly focus on these elements, streamlining clinical and laboratory monitoring, standardizing first-line and second-line treatment procedures, and harmonizing monitoring and assessment techniques. [1, 3]. This suggests that improving service delivery is a crucial step in reducing the spread of HIV infections and to enhance the health systems strengthening framework.

The HIV epidemic in Nigeria is currently one of the most severe in the world [4]. The disease affects a large proportion of adults and adolescents, particularly those who are vulnerable or have high-risk behaviours. Like most countries in sub-Saharan Africa, Nigeria has a high burden of HIV and limited domestic public health resources [5].

The country also faces other challenges such as insecurity, which impede effective health service delivery. HIV continues to spread rapidly across the country with increased prevalence in several states especially in the South-South and North-Central states [6]. Given this situation, there is an urgent need for sustainable response programs to curtail this

pandemic. To address these challenges, several health service delivery models have been adopted [7]. Aiming to meet the UNAIDS 95-95-95 global HIV goals, various service delivery models- both formal and informal have been developed to strengthen treatment, continuum of care, and provide health services to individuals living with or at risk of contracting HIV, focusing on implementation strategies and operations management techniques. The most common intervention models fall under one of three categories: Clinical centralized service delivery (CSD), decentralized service delivery (DSD) and community-based services (CBS) [8].

The CSD model is the primary standard for HIV health services delivery in most countries. It aims to provide all HIV-related services in a central facility that is accessible to people living with or at risk of contracting HIV, regardless of their geographic location [9]. A key advantage of this model is its easy implementation as it only requires a health facility with trained staff. The central facility is usually supported by a network of satellite clinics that offer integrated primary health care services. This ensures that HIV services are integrated with other health care services to improve the quality of care and access to HIV services [10]. The central facility is usually equipped with diagnostic tools, treatment rooms and other facilities for patients requiring urgent care. The HIV services are concentrated at a central hub clinic with satellite clinics linked to it.

However, even though services can be provided with high quality to many people in this model, it is rather expensive as the facilities at the hub clinic are likely to be large and equipped with expensive equipment [11]. Also, patients may need to travel to the hub clinic as it may be far from a patient's residence. The out-patient clinic model; antiretroviral therapy (ART) clinic model, and clinical mentorship programs fall under this model [12]. Successive reforms have attempted to make health care systems more effective, equitable, and responsive, but they

continue to produce subpar results. The health systems in Nigeria also grapples with fundamental issues in providing quality service delivery such as access to basic lifesaving interventions. The primary health care system in Nigeria is mandated to ensure the country achieves universal health coverage. Despite undergoing several reforms to strengthen its activities and performance, several barriers still impede quality service delivery at primary health care level [13].

Insufficient skilled workers, unavailability of drugs at subsidized rates, high staff workload, cultural barriers, patients' socioeconomic factors administrative challenges, lack of essential hospital tools, poor infrastructure, and difficulty in adapting some guideline recommendations remains key inhibitors to receiving quality care in PHCs [14]. These inhibiting factors further compound Nigeria's generally weak health systems resulting in poor service delivery. Sadly, service quality monitoring has not yet been imbedded in the national health policy, resulting in a lack of oversight, poor client safety and satisfaction [15].

However, HIV care and treatment programs stand out from the rest of the health sector due to the influence of the resources and monitoring systems made available through donor funding [16]. Even in situations where things might not be working well in other sections of a hospital or clinic, the facilities receiving support for HIV services from donors implementing partners (IPs) have considerably better-quality services and these usually have a positive spill over effect on the health systems [17].

To mitigate its substantial HIV burden and the resultant challenge in reaching coverage targets of HIV services, the Nigerian government has identified potential mechanisms to improve service delivery such as decentralizing services from secondary and tertiary facilities to primary care clinics, integrating HIV care and treatment services into routine health services, expanding demand generation activities, increasing task-

shifting, and strengthening community mobilization and integrated service delivery [18].

To achieve quality in health care delivery, it is necessary to plan and implement several separate interventions all at once. Quality health services, and their precise structure and content, will vary depending on location, but the following indicators should be present in any well-functioning health system:

1. Number and distribution of health facilities per 10 000 population.
2. Number and distribution of inpatient beds per 10 000 population,
3. Number of outpatient department visits per 10 000 population per year
4. General Service readiness score for health facilities.
5. Proportion of health facilities offering specific services.
6. Number and distribution of health facilities offering specific services per 10 000 population.
7. Service-specific readiness score for health facilities.

Given that marked variations exist in HIV prevalence and treatment coverage across Nigerian subnational units [21,22], it is imperative that interventions become context-specific at these levels. We report outcomes of two variants of an extensive commART programme implemented in 14 local government areas (LGAs) across four of Nigeria's 36 states. Our primary hypothesis was that this commART programme would increase the level and trend of identification of people living with HIV as well as treatment access and uptake within implementing LGAs. The need for quality health service is universal across the various states and regions of Nigeria, even though HIV prevalence and treatment coverage vary greatly between them.

The purpose of this research is to compare the health outcomes in the South and the Northeast considering the differences in the quality of health care services provided and health service models adopted [18].

Materials and Methods

This study adopted a descriptive-retrospective comparative research design with a focus on member states in the South-South and North-East geopolitical zones of Nigeria. A total of six states from the two regions were selected based on HIV prevalence within the state. Specifically, health facilities in Akwa-Ibom, Adamawa, Taraba, Gombe, Delta and Cross-Rivers state were visited for this study.

The study population included health workers in HIV programming in the South-South and North-East geopolitical zones of Nigeria, as well as people living with HIV within the geopolitical zones. Qualitative and quantitative data were collected retrospectively to gain insight on HIV programming using the WHO health system strengthening framework. The study adopted both probability and non-probability sampling techniques. Purposive sampling was used to select the sample states in each geopolitical zone and also to select respondents for the qualitative data collection. Cluster random sampling was used to select the respondents for the quantitative data collection. The sample size was determined using Smith's approach, and 385 respondents were selected. Key Informant Interviews (KIIs), survey methods, and desk review of literature were the main data collection instruments. Multi-method approaches were employed to ensure that the tools measured what they were intended to measure. The validity and reliability of the instruments were ensured through various techniques, such as recording accurate descriptions of individuals and circumstances and using participant-recorded perceptions in recordings.

Results

The findings of this research were organized following the core indicators for this research. The results for each of the core indicators can be found in the following:

The level of service delivery of HIV interventions is crucial for ensuring that people living with HIV receive timely and adequate

care [19]. Several factors can influence the level of service delivery, including the number and distribution of health facilities, the general service readiness score for health facilities, the proportion of health facilities offering specific services, the number and distribution of health facilities offering specific services per 10,000 populations, and the service-specific readiness score for health facilities [20].

The number and distribution of health facilities per 10,000 people is essential in determining the accessibility of HIV interventions. In many low- and middle-income nations, the quantity of health facilities is insufficient, and distribution is uneven, with rural areas frequently having restricted access to health services. This can lead to disparities in HIV service delivery and health outcomes [21].

The general service readiness score for health facilities assesses a facility's overall capacity to provide quality HIV interventions. Infrastructure, equipment, essential medicines, and manpower are all considered. Higher readiness scores indicate that health facilities are better able to deliver comprehensive HIV services and enhance health outcomes [22].

The proportion of health facilities that provide specific services is an important measure of HIV intervention availability. HIV testing and counselling (HTC) services, for example, are critical for identifying new HIV infections and connecting people to care and treatment. As a result, the provision of HTC services in health facilities is critical for enhancing health outcomes [23]. The number and distribution of health facilities providing certain services per 10,000 people are critical indices of HIV intervention accessibility. Many nations have a dearth of health workers and health facilities providing specialist HIV care are concentrated in metropolitan areas, limiting access for rural communities [24].

The service-specific readiness score for health facilities assess a facility's ability to deliver certain HIV interventions. It considers issues such as personnel training, commodity

availability, and quality assurance procedures. Higher service-specific readiness scores indicate that health facilities are better prepared to administer specialized HIV interventions such as antiretroviral medication (ART), viral load monitoring, and prevention of mother-to-child transmission (PMTCT) [25]. The findings of this research were organized following the core indicators for this research.

Desk-review of secondary data and related literature was conducted to obtain the results for some indicators. Primary data was collected to analyse the General-service readiness score and specific service readiness score. The results for each of the core indicators can be found in the following sub-headings.

Number and Distribution of Health Facilities per 10,000 Population in the South-South and North-East

HIV programming is significantly impacted by the number and distribution of health facilities per 10,000 people. Typically, HIV programming includes a number of interventions, such as prevention, treatment, care, and support, all of which ask for access to various health services. The quantity and dispersion of medical facilities can have an impact on the accessibility, availability, and quality of these services. Ayisi Addo et al., conducted a study in 2018, on the Availability of HIV services for the continuum of care in Ghana, where he indicated that increased access to vital HIV prevention, testing, treatment, and care services can help to lessen the burden of HIV and improve health outcomes for those living with the disease. This can be accomplished by ensuring that there are an adequate number of health facilities and that they are distributed properly [26].

According to WHO standard, every 10,000-person population should have at least a basic healthcare facility. Five hospital beds should be available for every 1,000 people, and every 10,000 people should have access to 23

healthcare experts. However, this is not the case in Nigeria.

As of October 2022, the average number of primary healthcare (PHCs) facilities per 10,000 population in the North-East is 0.1, which is nowhere close to the minimum requirement by WHO. The South-South had a mean score of 0.9 which is closer to the WHO standard than the North-East. The lower mean scores observed from the North-East could be as a result of their larger population size as Adamawa alone has a population size of 4,902,100 and the recorded number of PHCs in Adamawa is 40. The South-South also had a higher number of PHCs in the states were Akwa - Ibom had 425 PHCs with a population size of 3,920,208 people and Cross-Rivers had 196 PHCs with an estimated population of 3 million persons.

Number and Distribution of Inpatient Beds per 1000 Population

The number of inpatient beds per 10,000 population is a key indicator of the capacity of a healthcare system to provide hospital-based care. The World Health Organization (WHO) recommends that there should be at least three (3) inpatient beds per 1,000 population to meet the basic health needs of a population. However, as of 2022, the number of inpatient beds per 1,000 population in Nigeria was significantly lower than the WHO recommendation, with an average of 0.06 inpatient beds per 10,000 population.

The number of inpatient beds per 1,000 population varies widely across regions in Nigeria. In the North-East region, which includes Taraba and Adamawa states, the average number of inpatient beds per 1,000 population was 0.02, significantly below the WHO standard. In contrast, the South-South region, which includes Akwa Ibom and Cross River states, had an average of 0.18 inpatient beds per 1,000 population, relatively closer to the WHO standard.

Number of Outpatient Department Visits per 10 000 Population Per Year

The number of outpatient department (OPD) visits per 10,000 population per year is a measure of the demand for primary healthcare services. The number of OPD visits per 10,000 population in Nigeria varies widely across regions. As of 2022, the North-East region had an average of 35 OPD visits per 10,000 population per year, while the South-South region had an average of 165 OPD visits per 10,000 population per year.

Proportion of Health Facilities Offering Specific Services

The availability of essential healthcare services is crucial to improving health outcomes and reducing health disparities in Nigeria. The proportion of health facilities offering specific services is an important indicator of the availability of essential healthcare services in different regions. In Nigeria, the proportion of health facilities offering specific services varies widely across regions, with healthcare access and outcomes implications.

As of 2022, the South-South region had a higher proportion of health facilities offering essential services such as antiretroviral therapy (ART) for HIV treatment, prevention of mother-to-child transmission (PMTCT) of HIV, and HIV counselling and testing, compared to the North-East region. The higher proportion of

health facilities offering essential services in the South-South region implies that HIV patients in this region have better access to essential HIV services compared to the North-East region. However, there is still a need for further improvement in the availability and distribution of essential healthcare services in Nigeria.

General Service Readiness

The general service readiness score reflects the level of readiness for hospitals and PHCCs to offer services. The general service readiness score (basic equipment, diagnostics, staff training and guideline, medicines, and commodities) for each of the regions (North-East and South-South) was carried out using the formula; $n/\text{tracer items} \times 100$. Where n is the total number of items available in each facility visited in the study locations (North-East and South-South), and the denominator is the number of indicator tracer items for each of the domains (basic equipment, diagnostics, staff training, and guideline, medicines, and commodities).

The mean scores for percentage readiness for the states within each region was tabulated and the findings of the general service readiness assessment can be found in the Table 1.

The findings revealed that all the health facilities (both the North-East and South-South) expressed at least 94% general service readiness to deliver HIV program services.

Table 1. General Service Readiness by Region

General Service Readiness	Index (Mean Percent)	
	North-East (%)	South-South (%)
Guidelines and Training Availability	93.5	84.2
Diagnostic services availability	100	98.5
Equipment availability	95	97
Medicines and Commodities availability	89	97
Average	94.4	94.2

Also worthy of note in determining the General Service Readiness for HIV programming is the Integration of HIV services with other services in the health facility. Assembling HIV prevention, testing, treatment,

and care services with other healthcare services like primary care, maternal and child health, tuberculosis (TB) control, sexual and reproductive health, and other pertinent health

services is known as integrating HIV program with other services in a health facility.

By making sure that patients receive comprehensive and holistic treatment, this strategy strives to improve the quality, effectiveness, and efficiency of healthcare delivery. Also, it encourages more open access to services and lessens the stigma attached to HIV. HIV programming can be integrated with other services in a variety of ways, such as offering HIV testing as part of normal physical examinations, incorporating HIV care into the management of chronic diseases, or offering counselling and testing services in prenatal clinics. Overall, integrating HIV program with other services in a health institution is an essential step in accomplishing the international objective of putting an end to the AIDS epidemic by 2030.

The study respondents affirmed that HIV services were being integrated with other services in their facility. A respondent from the South-South stated that *“Yes, the services are integrated, because if you want to focus on HIV alone because of stigma people will not come so*

we integrate we bring in malaria, we bring in something about male reproductive health and we bring in other things.”

Service Specific Readiness

Service-specific readiness is the ability of healthcare institutions to deliver a particular service, as determined by the existence of tracer items including **trained personnel, guidelines, tools and supplies, diagnostic capability, medications, and supplies.** This study focused on the readiness of health facilities in the North-East and South-South to deliver HIV programmatic services. To determine the specific readiness score per region, a score of “1” was awarded when a relevant item required for service delivery was available and “0” mark awarded when it was not available. Percentages were used to present the various HIV services available at PHC facilities in the regions. The service specific readiness score was then computed and tabulated using the mean percentage scores for both regions. These findings can be found in the table below.

Table 2. HIV Service Readiness by Region

HIV Service Readiness	Index (Mean Percent)	
	North-East	South-South
Availability of National ART guidelines	45.6	54.4
Availability of National HIV counselling and testing guidelines	55.2	44.8
Training of staff on involuntary counselling and testing	52.1	47.9
Training on HIV prevention care and management	60.3	39.7
Training on ART prescription	56.7	43.3
HIV counselling and testing services	51.2	48.8
Availability of private room/area for HIV testing and counselling services	54.5	45.5
Availability of condoms	51.6	48.4
Average	53.4	46.6

The table above presents the HIV service readiness index for Nigeria’s North-East and South-South regions. The HIV service readiness index was measured using the mean percentage of several indicators, including the availability of national ART guidelines, national HIV counselling and testing guidelines, training of

staff on involuntary counselling and testing, training on HIV prevention care and management, training on ART prescription, HIV counselling and testing services, availability of private room/area for HIV testing and counselling services, and availability of condoms.

The findings indicate that the North-East region had a higher HIV service readiness index than the South-South region. Specifically, the North-East region had an average HIV service readiness index of 53.4%, while the South-South region had an average HIV service readiness index of 46.6%. The availability of national ART guidelines was higher in the South-South region than in the North-East region, with a mean percentage of 54.4% and 45.6%, respectively. The availability of national HIV counselling and testing guidelines was higher in the North-East region than in the South-South region, with a mean percentage of 55.2% and 44.8%, respectively. The training of staff on involuntary counselling and testing was slightly higher in the North-East region than in the South-South region, with a mean percentage of 52.1% and 47.9%, respectively. Training on HIV prevention care and management, training on ART prescription, HIV counselling and testing services, availability of private room/area for HIV testing and counselling services, and availability of condoms all showed disparities between the North-East and South-South regions.

The study participants from both regions also echoed that they had HIV testing and counselling services readily available and accessible in their community. This was described in terms of proximity to the HIV service units, ease of access in locating the HIV centres within the community, and the creation

of more HIV service outlet around the communities due to community members taking ownership of ensuring the target population can easily access these HIV services. Some communities in the South-South have taken ownership of promoting the availability of HIV testing and counselling services by creating “foot-soldiers” within the communities to sensitize and create awareness on the availability of these HIV services. The participants also established in the North-East, a “care-givers forum” that was used to disburse information on HIV services and manage the treatments of the HIV patients. Through the adequate availability of HIV counselling and testing services, the queues at the health facilities are less and the people also have more locations they can visit for care.

Inferential statistics was done to determine whether there is a significant difference in the extent of quality-of-service delivery outputs for HIV programming in South-South and North-East, Nigeria. The findings of the hypothesis testing can be found in Table 3. The table shows the p-value for the quality-of-service delivery outputs for HIV programming in South-South and North-East, Nigeria. The p-value for HIV service delivery is 0.064 which is higher than 0.05 level of significance. Hence, the null hypothesis is accepted. The findings presented on table 3 implies that there is no significant difference in the quality-of-service delivery outputs in the North-East and South-South.

Table 3. Hypothesis Testing for the Quality-of-Service Delivery Outputs for HIV Programming by Region

Region	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	p-value
North-East	53.4	1.544345	4.368066	49.74821 57.05179	0.064
South-South	46.6	1.544345	4.368066	42.94821 50.25179	

t = 2.2016, degree of freedom (df)

Discussion

The variations in the number and distribution of healthcare facilities between the North-East and South-South regions may be due to a combination of factors, including funding and resource allocation, political will, and

infrastructure development. The North-East region has faced significant security challenges due to the Boko Haram insurgency, which may have affected its development and resource allocation, including healthcare. Conversely, the South-South region is a major oil-producing region, and its relative affluence may have

contributed to the higher number of healthcare facilities in the region [27].

The inadequacy of healthcare facilities in the North-East region highlights the urgent need for interventions to improve access to healthcare services in the region. Addressing this issue requires a multi-pronged approach, including increasing funding for healthcare, improving infrastructure, and prioritizing the development of healthcare facilities in underserved areas. Additionally, there is a need for targeted interventions to address the disparities in healthcare access and distribution between regions [28]. The number and distribution of healthcare facilities in Nigeria's North-East and South-South regions have significant implications for HIV programming. Ensuring adequate healthcare facilities and their appropriate distribution is crucial for improving access to essential HIV services and achieving better health outcomes for people living with HIV [29].

The inadequate number of inpatient beds in the North-East region implies that hospital-based care for HIV patients is limited. HIV patients in this region may not receive the appropriate hospital-based care and support they need, leading to poor health outcomes. In addition to HIV patients, other patients requiring hospital-based care may also be affected [30]. In Taraba State, which is in the North-East region, there were only 17 functional general hospitals and 100 primary healthcare centres in serving a population of over 3 million people [31]. This implies that the availability of inpatient beds in the state may be limited, which could impact the provision of hospital-based care for HIV patients and other patients. In Adamawa State, also located in the North-East region, there were only 14 functional hospitals and 70 primary healthcare centres in 2019 [31]. In contrast, the South-South region, Akwa Ibom State had a total of 31 general hospitals and 415 primary healthcare centres as of 2019 [31]. The state has made significant strides in healthcare infrastructure development, which has

contributed to the relatively higher availability of inpatient beds in the region. In Cross River State, there were a total of 22 general hospitals and 172 primary healthcare centres as of 2019 [31]. Although the number of inpatient beds is still grossly inadequate in both the south south and north east, the distribution of inpatient beds in the North-East region of Nigeria is a significant challenge that needs to be addressed urgently [32]. The government needs to invest in the development of healthcare infrastructure to ensure that patients receive optimal hospital-based care. Furthermore, healthcare infrastructure development should be prioritized in underserved areas to improve healthcare access and reduce regional disparities in healthcare [33].

The shortage of hospital beds is a critical issue affecting healthcare delivery in Nigeria and other African countries. This discussion will focus on the deficit of inpatient beds per 1000 population in Africa, with particular attention given to Nigeria and other African countries' hospital bed availability [34].

The deficit of inpatient beds per 1000 population is a significant challenge across Africa, with many countries struggling to meet the WHO-recommended minimum of three beds per 1,000 people. According to the World Bank, in 2019, Nigeria had only 0.6 hospital beds per 1,000 people, significantly lower than the recommended minimum. This is one of Africa's lowest hospital bed availability rates, making it challenging to provide adequate hospital-based care to the population.

Compared to other African countries, Nigeria's hospital bed availability rate is lower. For example, South Africa, Egypt, and Tunisia, have a higher number of hospital beds per capita, with 2.8, 3.4, and 2.5 hospital beds per 1,000 people, respectively. Similarly, according to the world bank, Algeria and Libya had 1.9 and 2.7 hospital beds per 1,000 people. This discrepancy in hospital bed availability across African countries highlights the need for increased investment in healthcare infrastructure to

improve the quality and accessibility of healthcare services across the continent [35].

The limited availability of inpatient beds has a significant impacts healthcare delivery across Africa, leading to long wait times, overcrowding, and suboptimal care delivery. This situation is particularly challenging for patients with chronic and life-threatening conditions, such as HIV/AIDS, cancer, and cardiovascular diseases, who require continuous hospital-based care and support [32, 36]. The shortage of inpatient beds puts a strain on the capacity of healthcare facilities to provide hospital-based care, leading to a decreased quality of care, increased morbidity and mortality, and a decreased capacity to manage disease outbreaks and emergencies [33,37]. The deficit of inpatient beds per 1000 population is a significant challenge across Africa, with Nigeria having one of the lowest hospital bed availability rates in the continent. The limited availability of inpatient beds has a significant impact on healthcare delivery, leading to long wait times, overcrowding, and suboptimal care delivery[37]. To address this challenge, African countries must increase investment in healthcare infrastructure to improve the quality and accessibility of healthcare services, particularly for patients with chronic and life-threatening conditions [37].

To improve the availability of essential healthcare services in the North-East region, the government needs to prioritize the development of healthcare infrastructure and the recruitment of healthcare personnel [38].

Prioritizing the development of healthcare infrastructure and the recruitment of healthcare personnel can be achieved through increased investment in healthcare infrastructure, including the construction of hospitals, clinics, and health centers [39]. Additionally, the government can provide incentives to healthcare workers to encourage them to work in the North-East region, such as offering higher salaries and better working conditions [40].

In addition to prioritizing healthcare infrastructure and personnel recruitment, addressing the underlying factors contributing to healthcare access disparities in the region is essential. This includes poverty, limited health literacy, and inadequate healthcare financing [41]. Strategies for addressing these factors may include poverty alleviation programs, health education campaigns to improve health literacy, and increased investment in healthcare financing [42].

Finally, implementing innovative healthcare delivery models can improve the accessibility of essential healthcare services in remote and underserved areas [43]. Telemedicine, for example, can provide remote access to healthcare services and improve healthcare outcomes for individuals living in remote areas [44]. Community health worker programs can also improve healthcare access by providing healthcare services directly to individuals in their communities [45].

In conclusion, improving healthcare access in the North-East region will require a multifaceted approach that includes prioritizing healthcare infrastructure and personnel recruitment, addressing underlying factors that contribute to healthcare access disparities, and implementing innovative healthcare delivery models [46]. By implementing these strategies, the government can improve the availability of essential healthcare services in the North-East region, ultimately improving the health outcomes of the population in the region [47].

Conclusion

The average number of primary healthcare (PHCs) facilities per 10,000 population in the North-East is 0.1, which is significantly lower than the WHO standard of having at least one basic healthcare facility per 10,000 people. The South-South had a mean score of 0.9, which is closer to the WHO standard than the North-East. The number of inpatient beds per 1,000 population in Nigeria was significantly lower than the WHO recommendation, with an average

of 0.06 inpatient beds per 10,000 population. The North-East region had an average of 0.02 inpatient beds per 1,000 population, significantly below the WHO standard, while the South-South region had an average of 0.18 inpatient beds per 1,000 population, relatively closer to the WHO standard. The limited availability of inpatient beds puts a strain on the capacity of healthcare facilities to provide hospital-based care, leading to long wait times, overcrowding, and suboptimal care delivery. This situation is particularly challenging for patients with chronic and life-threatening conditions, such as HIV/AIDS, cancer, and cardiovascular diseases, who require continuous hospital-based care and support. The number of outpatient department visits per 10,000 population per year varies widely across regions in Nigeria, with the South-South region having a higher average than the North-East region.

The availability of essential healthcare services, such as antiretroviral therapy (ART) for HIV treatment, prevention of mother-to-child transmission (PMTCT) of HIV, and HIV counselling and testing, varies widely across regions in Nigeria, with the South-South region having a higher proportion of health facilities offering these services than the North-East region. The general service readiness score for delivering HIV program services was at least 94% in all health facilities in both the North-East and South-South regions. The HIV service readiness index for the North-East region was higher than that of the South-South region, with

some disparities in the availability of national ART guidelines, national HIV counselling and testing guidelines, training of staff, and availability of condoms. HIV testing and counselling services were described as readily available and accessible in both regions, with some communities taking ownership of promoting the availability of these services.

In conclusion, the key findings which emerged from this research shows that the North-East region of Nigeria had significantly lower numbers of primary healthcare facilities and inpatient beds per 10,000 population compared to the South-South region, resulting in challenges in providing hospital-based care for patients with chronic and life-threatening conditions. However, both regions had a relatively high service readiness score for delivering HIV program services, with some disparities in the availability of national guidelines and training of staff.

Conflict of Interest

We declare that there are no conflicts of interest. None of the authors have any financial or personal connections to individuals or companies that might impact their work or how the findings are perceived. Additionally, we did not receive any funding or support from any organizations or institutions that could benefit from the publication of this study. Our main goal in conducting this research was simply to contribute to the advancement of public health knowledge

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