

Review

The triple impact of economic hardship, insecurity, and flooding on access to antiretroviral therapy: a focus on people living with HIV/AIDS in Maiduguri, Nigeria

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Abstract

Background The multifaceted impact of economic hardship, insecurity, and flooding on access to antiretroviral therapy (ART) among people living with HIV/AIDS (PLHIV) in Maiduguri, Nigeria is highlighted by this article. While ART has transformed HIV from a fatal condition to a manageable chronic illness, achieving consistent access in regions facing socioeconomic and environmental challenges such as Maiduguri remains a critical issue. Factors such as inflation, poverty, and high transportation costs hinder PLHIV's ability to obtain treatment and related medical services. Although antiretroviral drugs are subsidised in Nigeria, associated costs, including transport-fare and laboratory fees, place a significant burden on patients. This financial strain disrupts adherence to treatment, risking clinical failures and drug resistance. Insecurity due to the Boko Haram insurgency exacerbates these challenges.

Methods A comprehensive literature search was conducted using keywords such as ART, economic hardship, Maiduguri, flooding, and insecurity to identify relevant articles from Scopus, PubMed, and Google Scholar. Boolean operators "AND" and "OR" were applied to construct precise search strings, ensuring broad yet targeted retrieval of relevant studies. A total of 27 articles were included based on their relevance, methodological quality, and contribution to the study's aim.

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Eligible publications encompassed original research, systematic and narrative reviews, meta-analyses, perspectives, and grey literature, with priority given to studies published in English within the last ten years. A snowballing bibliometric approach was also employed to identify additional relevant literature. Full-text articles were critically analyzed and narratively synthesized under appropriate subheadings.

Conclusion There is an urgent need for comprehensive strategies that address these interlinked issues. Bolstering healthcare infrastructure, developing climate-resilient HIV prevention strategies, and enhancing policy frameworks for emergency health response, strengthening government coordination and securing both local and international support are vital for sustaining ART access. These could assist to improving health outcomes for vulnerable populations such as PLHIV in conflict and disaster-affected areas like Maiduguri.

Keywords Economic hardship · Insecurity · ART · PLHIV · Maiduguri Nigeria · Flooding

1 Introduction

Access to human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) treatment is critical to the global drive to eliminate the disease as a public health concern. In 2023, there were 39.9 million HIV-positive people globally, with 38.6 million adults (> 15 years old) and 1.4 million children (< 15 years old) [1]. Sub-Saharan Africa (SSA) has the highest prevalence of people living with HIV (PLHIV), driven by complex challenges such as high transmission rates and socio-economic factors, even though access to therapy has improved [1]. It is interesting to note that, antiretroviral therapy (ART) has played a major role in the lives of PLHIV. ART has transformed HIV treatment from a lethal disease to a manageable chronic condition, dramatically enhancing the life expectancy and quality of life for infected individuals [2]. As a country with the 4th highest HIV burden in the world, where; approximately 1,910,405 individuals are living with HIV [3]; ART programmes in Nigeria are unfortunately faced with challenges despite progress in its HIV care delivery. These challenges including economic hardship and insecurity have been prominent especially in the Northeastern part of the country, comprising States as Borno, Gombe, Bauchi, Adamawa, Yobe and Taraba.

According to recent estimates, the general HIV prevalence in Borno, a major state impacted by insecurity and economic hardships in Northeastern Nigeria is at 1.3%, with higher rates found in internally displaced persons (IDP) camps, where prevalence can reach up to 1.98% [4]. Coupled with the recent flooding, Maiduguri, the capital of Borno State, has been greatly impacted by the ongoing insecurity, displacement, and humanitarian problems. This has added more hardships to the vulnerable populations such as PLHIV. The collapse of Alau Dam situated 20 km south on the Ngadda River in the Alau community of Konduga local government area of Borno state has caused a lot of people to abandon their houses, causing population displacement, increased sexual networks, and possible HIV transmission [5].

Therefore, this study highlighted on how access to ART among PLHIV in Maiduguri was impacted by the interaction of economic hardship, insecurity and flooding. It further proffered sustainable solutions on how the menace can be curbed through public health initiatives and improvement of policies regarding access to ART for PLHIV particularly during economic crises, conflicts and natural disasters.

2 Methodology

A comprehensive narrative review was conducted using Scopus, PubMed, and Google Scholar, alongside targeted searches of reputable online sources, to identify relevant studies on flooding, insecurity, antiretroviral therapy (ART), and economic hardship. These databases were chosen for their extensive coverage, citation tools, and specialization in scientific literature. Web of Science (WoS) was excluded due to subscription restrictions, overlap with Scopus, and discipline-specific limitations. The total number of 27 articles were reviewed in this review.

Search Strategy: Boolean operators "AND" and "OR" were used to construct precise search strings, such as: ("Economic hardship") AND ("Flooding") AND ("Antiretroviral therapy" OR "ART"). These search strings were consistently applied across databases to ensure uniformity and a broad retrieval of relevant articles.

Selection criteria: Eligible publications included original articles, systematic and narrative reviews, meta-analyses, perspectives, commentaries, and grey literature. While no publication year limit was imposed, priority was given to studies from the last ten years, written in English. Studies were excluded if they were non-English, lacked accessible

full texts, or did not contribute to the study's aim. A snowballing bibliometric approach was also employed to identify additional relevant literature.

Quality assessment and data synthesis: Full-text articles were assessed for quality, with frequently cited and methodologically sound studies prioritized. Studies with poor methodology or incomplete data were excluded. Given the scope of this narrative review, only pertinent articles directly addressing the research aim were included. The findings are critically analysed and narratively presented under appropriate subheadings.

3 Economic hardship and its impact on access to ART

According to the World Bank statistics, Nigeria's economy witnessed a broad-based sustained growth of 7% on the average between 2000 and 2014 due to favourable global conditions, microeconomics and structural reforms. However, from 2015 to 2022, the economic growth rate had decreased, and Gross Domestic Product (GDP) flattened, propelled by exchange rate policy distortion, fiscal deficit increases due to low oil production, costly fuel subsidy policies, increased trade protectionism and external shocks such as the COVID-19 pandemic. Furthermore, weakened economic fundamentals coupled with sluggish economic growth has led the country's inflation to reach a 24-years high of 31.7% in February 2024, pushing millions of Nigerians into poverty [5]. With an estimated 87 million Nigerians living below the poverty line, the country was expected to have the second-highest rate of poverty in the world in 2023, at 38.9% after India [6].

Borno state had been reported to have a GDP of 1.96 trillion Naira [7]. The state's economy had enjoyed robust agricultural and commercial activities fostered by the presence of Lake Chad. However, the state's economy was hampered over the past few years due to the activities of the Boko Haram insurgency. This has been further exacerbated by high inflation and persistent widespread poverty. These conditions potentially create challenges for PLHIV, as they are faced with financial hurdles that affect their access to ART and other HIV services. With many populations including PLHIV residing in IDP camps and without any form of livelihood in Borno State, a lot of pressure is placed on the limited infrastructures and available resources, thereby further exposing them to public health problems including poverty, disease spread, lack of access to potable drinking water and medications inaccessibility.

PLHIV in Maiduguri are the most hit as they are faced with more problems along with the economic hardship being experienced. Access to ART becomes difficult especially when they must travel long distances to get anti-retroviral (ARV) refill or access to healthy meals, thereby creating room for patients not being able to take their antiretroviral medication as prescribed, leading to poor adherence. This creates a myriad of health problems including medication resistance and treatment failure.

An additional factor fuelling the HIV pandemic is economic disparity among countries [8, 9] and which has impacted the food purchasing power of the affected countries especially among vulnerable population such as PLHIV. Although the ART medicines are subsidized in Nigeria with support from donor funds, the cost of traveling to the health facilities and other laboratory testing is borne by the patients [9, 10], and which has been heavily impacted by poverty; further causing missing clinic appointments and hindering adherence to ART regimen.

4 Insecurity and its impact on access to ART

Insecurity has remained one of the major challenges in Borno State over the last decade. Around 2014, when the Boko Haram insurgency was at its peak, approximately 40–70% of Borno State was under the control of the hostile entities, resulting in nearly 13,000 deaths across the northeast region of Nigeria [10]. This catastrophic event led to the decline of several critical sectors, including food, housing, livelihoods, transportation, healthcare, security, and education. The death and migration of healthcare providers, destruction of hospitals, and inadequate living conditions, where millions reside in densely populated Internally Displaced persons' camps within the state capital -Maiduguri-, collectively contribute to the systemic collapse of the healthcare infrastructure [11].

Furthermore, about 1.2 million people from various villages in Borno State migrated to the state capital to live in heavily guarded IDP camps, overwhelming all facilities, including hospitals, and making access to ART limited [2]. Additionally, heightened transportation costs due to poor roads and insecurity, especially in the outskirts of Borno State, made PLHIV reluctant to seek treatment and adhere to their medication [12, 13]. Insecurity has also posed significant challenges to food security and livelihoods. The death and migration of farmers and increased transportation costs from

local production areas have resulted into market instability. This is strongly associated with a lack of access to ART, as all efforts are diverted toward securing a basic livelihood [5], and which has been threatening the progress in the fight against HIV in Maiduguri and the whole state at large.

Moreover, the attention of policymakers, local and international humanitarian organizations was drawn to the situation primarily due to the development of drug-resistant HIV and the escalating number of fatalities among the most vulnerable community members, particularly women and children under the age of five suffering from AIDS. Approximately 126 organizations are working jointly with the government to provide emergency support such as shelter (camps), food items, non-food items, and healthcare services, including free or subsidized ART. Since access and adherence to ART remain the primary determinants of clinical outcomes [13, 14], this calls for further support and intervention for the PLHIV in Maiduguri during this trial period.

5 Flooding and its impact on access to ART

Nigeria's national development is to an extent hindered by the recurring issue of flooding, which is largely attributed to inadequate urban planning and the escalating impacts of climate change. One of the most impactful flooding in Nigeria is the recent flooding experienced by Borno State, in its capital city, Maiduguri. On 10 September 2024, Maiduguri was submerged by severe flooding occurrences from the Alau Dam due to structural problems and heavy rainfall, forcing residents to migrate to neighbouring communities in search for refuge (Fig. 1). Prior to the collapse of the dam, over 123,000 people in the state had been impacted by floods and storms since August 2024 [15]. The recent statewide flooding has not only depleted government resources but has also severely disrupted community resilience and coping mechanisms, exacerbating the social and economic impacts on affected populations. This is because the flooding



Fig. 1 The flood affected areas of Maiduguri, Borno State Nigeria, 2024. Source: https://cdn-images-1.medium.com/max/800/1*wzfuFKyhZFhQxARjWUkUnQ.jpeg

coincided with the height of a food crisis and the country's lean production season [15], where it was estimated that 240,000 people were affected.

In the face of multiple crises cutting across insecurity, economic instability and food scarcity, health service delivery within Maiduguri has been further hampered by the recent flooding. Access to and engagement with HIV care have been negatively impacted by economic and livelihood-related difficulties associated with the floods. Two of the four major ART centers in the city—Maiduguri State Specialist Hospital and the University of Maiduguri Teaching Hospital, the largest in terms of the number of PLHIV accessing ART in the state—have been affected by the flood. While the other two facilities in the metropolis, Muhammad Shuwa Memorial Hospital and Umaru Shehu Ultra-Modern Hospital, were mildly impacted by the flood. Access to these centers was limited for PLHIV due to the flood-related road cut-offs and widespread displacement, which has severely hindered access to medical services in the city. This has a considerable influence on access to ART in conflict-affected settings such as Maiduguri, which has been afflicted by the Boko-Haram insurgency for over a decade. During this time, unemployment, financial instability, food insecurity and a lack of transportation all serve to lower patients' willingness to continue receiving HIV care [16]. Like other disasters, this has compounded an already dismal situation for PLHIV in Maiduguri and other affected areas.

Additionally, antiretroviral therapy regimens can be distorted by the ensuing financial shocks brought on by the flooding; further diminishing adherence as individuals prioritize sustenance and finances over attending ART clinics and thereby potentially causing declines in CD4 cell counts and viral load elevations [17]. Beyond the impact on PLHIV's access to ART, healthcare providers were pressurised to offer emergency care to an increasing number of patients with inadequate infrastructure and a shortage of supplies; as many other healthcare facilities in Borno have been particularly affected by the flash floods.

More so, these variables alter the behaviour of PLHIV, hindering them from seeking out health-support services and which in turn, impact access to ART [18]. The impact of the flooding in Maiduguri has therefore, significantly impacted the overall health sector, resulting in a diminished priority for HIV in favour of other pressing health issues and other necessities like food assistance, housing, and portable water.

6 Strategies and policies put in place to curb the impact

Nigeria has a multi-level healthcare system across the federal, state, and local governments to curb the burden and impact of HIV/AIDS. Adhering to the "Three Ones" principles—a single agreed HIV/AIDS action framework, a single national AIDS coordinating authority, and one agreed monitoring and evaluation system—Nigeria ensures efficient coordination and implementation of HIV interventions. This structure supports the distribution of ART across multiple stakeholders and sectors, creating a robust network for addressing the epidemic's impact [19]. Key agencies play integral roles at various levels of governance: The National Agency for the Control of AIDS (NACA) leads at the federal level, while the State Agency for the Control of AIDS (SACA) and the Local Agency for the Control of AIDS (LACA) provide support at state and local levels, respectively [20]. NACA collaborates with 31 ministries, departments, and agencies to implement HIV/AIDS programs and ensure cohesive planning and execution across multiple sectors. In addition, the Federal Ministry of Health oversees health-related activities tied to the HIV response, while NACA coordinates multi-sectoral efforts, interfaces with different levels of government, promotes the integration of HIV interventions into larger social initiatives, and monitors and assesses national progress [21]. NACA's directives emphasize the importance of a holistic, public-health-driven approach to HIV/AIDS. It oversees activities that span multiple sectors, ensuring cooperation among federal, state, and local authorities and mainstreaming HIV interventions. Other primary responsibilities include formulating HIV policies, mobilizing local and international resources for equitable distribution, and enhancing the capacity of both NACA and stakeholders involved in the HIV response. Civil society organizations, such as CiSHAN and NEPWHAN, also play critical roles by organizing awareness campaigns and advocating for community needs. The business sector contributes through initiatives like NIBUCCA, which mobilize resources and bolster engagement in HIV interventions [22, 23].

The revised National HIV and AIDS Policy introduces a comprehensive framework aimed at reducing the impact of HIV/AIDS in Nigeria. This policy is structured around seven strategic thrusts, focusing on community engagement, prevention, treatment, care, support, resource mobilization, and sustainability. Aiming to cut new HIV infections by 90% by 2030, the policy prioritizes comprehensive testing, safer sexual practices, and improved accessibility of various HIV testing methods, enhancing both privacy and accessibility [20, 24]. A core component of this strategy is universal access to HIV treatment, ensuring prompt access to ART for newly diagnosed individuals. For comprehensive care, it incorporates mental health services, co-infection management, and non-communicable diseases into HIV treatment programs.

Providing comprehensive care and support to individuals living with and impacted by HIV is another key component of the strategy [25]. To sustain the national HIV/AIDS response, the policy emphasizes infrastructure development and resource mobilization, encouraging both national funding and locally driven solutions for effective healthcare resource management. Additionally, the policy promotes a rights-based approach, aiming to harmonize the HIV response within larger health and social systems and to foster an enabling environment for HIV care [20, 26].

The policy includes a commitment to data management and harmonization of HIV/AIDS response coordination by establishing a unified data system that supports collaboration among national and international partners. The emphasis on research and knowledge management is further bolstered by a robust research framework, ensuring peer review of findings and consistent progress in understanding and combating HIV. The combined objectives of these strategic thrusts are ambitious: the policy targets 90% awareness of HIV status, 90% ART coverage, and 90% viral suppression by 2023, with a planned increase to 95% by 2025 [27].

Despite this well organised structure in Nigeria, there has been raised concerns as to whether there have been provisions by governments, concerned non-governmental organisations and civil society organisations specifically tailored to the needs of PLHIV in times of natural disasters such as the recent flooding in Maiduguri; and which can foster access to ART and regimen adherence during economic hardships and insecurities. This has been a source of worry as all obvious efforts made by many organisations and agencies have been focused on shelter, nutrition, and other emergency healthcare provisions especially during the recent flooding, a natural disaster that has a great impact on the lives of vulnerable populations such as PLHIV.

7 Conclusion and recommendations

Access to ART for HIV/AIDS patients in Borno State, Nigeria, is a significant challenge due to economic hardship, insecurity, and environmental factors. Despite global efforts to eradicate AIDS, particularly in SSA, Nigeria, continues to face high HIV prevalence rates. PLHIV in Maiduguri are more vulnerable because of the humanitarian crisis in Borno State, which is made worse by persistent conflict and natural disasters. Poor health outcomes and medicine resistance are more likely because of healthcare services are being hampered by poverty, the economic slump, and infrastructural breakdown. Strengthening healthcare delivery systems and ensuring equitable access to ART is therefore essential for safeguarding vulnerable populations and contributing to global HIV/AIDS combat.

Therefore, Nigeria needs to enhance government leadership and coordination, strengthen institutional frameworks, clarify roles in managing Official Development Assistance (ODA), strengthen local and regional health systems, integrate health information systems, and develop a sustainable HIV financing plan tailored to PLHIV in disaster affected regions. To improve donor funding, Nigeria should develop clear sector strategies and policies outlining the roles of donor agencies and implementing partners. Strengthening the HIV/AIDS division of the Ministry of Health (NASCP) is essential for better integration and delivery of services. The National Planning Commission (NPC) should coordinate ODA across all sectors, ensuring transparency and efficiency in utilization. Local and regional health systems should be strengthened through the analysis of a system-wide gap to identify underserved populations and areas. Integrate disease-specific platforms into a robust health information system managed by the Ministry of Health to enhance data quality and facilitate informed decision-making. Addressing health financing mechanisms by enhancing the National Health Insurance Scheme with donor support is expedient. The creation of gender-sensitive, flood-specific, and climate-resilient HIV prevention strategies that include telemedicine services, thorough safe sex education, social and economic improvement, and stigma-reduction counselling initiatives should also be established and led by Nigerian governments.

The National Strategy for HIV (NSF) in Nigeria outlines the country's HIV response focusing on local, state, and federal-level needs. The strategy outlines clear national targets that stakeholders can adapt based on local epidemic profiles, resources, and priorities. Achieving the 90–90–90 targets, which require 90% of HIV patients to know their status, receive sustained antiretroviral therapy, and achieve viral suppression, requires significant resource scaling. The NSF's implementation is expected to be more resource-intensive than previous frameworks, necessitating increased investment in human, financial, and material resources. To address sustainability concerns, Nigeria should focus on increased domestic funding, targeting at least 50% of total resource needs, including allocating 15% of the national budget to health and strengthening alternative funding mechanisms like taxes and public–private partnerships. To ensure accountability and monitor the National Sexual Health Strategy's (NSS) implementation, the Monitoring and Evaluation (M&E) framework is essential. It entails methodical procedures for tracking advancement, assessing performance about metrics, and producing data for decision-making. Standardizing indicators and defining stakeholder roles in

data collecting and reporting are two goals of a national M&E plan. Frequent evaluations will highlight achievements, weaknesses, and modifications, encouraging ongoing enhancements to the national response. Based on evidence-based procedures, Nigeria's HIV response should invest in research to better understand the dynamics of the epidemic and improve program efficacy. By implementing these recommendations, Nigeria can better address the interrelated challenges of economic hardship, insecurity, and flooding, ultimately improving access to antiretroviral therapy for PLHIV in the country and especially in hard-hit regions like Maiduguri.

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Declarations

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