Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Evaluating the Impact of Kano State Contributory Healthcare Management Agency Integration of HIV Prevention, Treatment, and Lifelong Care on Healthcare Access and Financial Sustainability in Kano State, Nigeria: A Mixed-Methods Study

Rahila Aliyu Muktar
Kano State Contributory Healthcare Management Agency
Zainab Abdulkadir
zmeena2003@gmail.com

Aminu Kano Teaching
Abdulgafar Lekan Olawumi
Aminu Kano Teaching
Al-Ameen Yahya Harande
Kano State Contributory Healthcare Management Agency

Research Article

Keywords: HIV/AIDS, Universal Health Coverage, Social Health Insurance, Financial Sustainability, Kano State, Evaluation Indicators, Health Financing

Posted Date: September 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10914337/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Evaluating the Impact of Kano State Contributory Healthcare Management Agency Integration of HIV Prevention, Treatment, and Lifelong Care on Healthcare Access and Financial Sustainability in Kano State, Nigeria: A Mixed-Methods Study.

Authors:

Rahila Aliyu Muktar, Department of Community Medicine, Northwest University, Kano State Contributory Healthcare Management Agency, Nigeria, Kano, Email: rahilamuktar.ra.@gmail.com

Zainab Abdulkadir, Department of Family Medicine, Aminu Kano Teaching Hospital, Kano, Nigeria. Email: zmeena2003@gmail.com.

Abdulgafar Lekan Olawumi, Department of Family Medicine, Aminu Kano Teaching Hospital, Kano, Nigeria. Email: abdulgafarolawumi@yahoo.com

Al-ameen Yahya Harande, Kano State Contributory Healthcare Management Agency, Kano, Nigeria. Email: alameenaminu321@gmail.com

Affiliations:[1]Kano State Contributory Healthcare Management Agency

[2]Department of Family Medicine, Aminu Kano Teaching Hospital, Kano

[3]Department of Community Medicine, Northwest University, Kano

Corresponding author: Dr Zainab Abdulkadir, Department of Family Medicine, Aminu Kano Teaching Hospital, Kano, Nigeria, Email: zmeena2003@gmail.com. 0000-0002-9846-3278.

Clinical trial number: Not applicable

ABSTRACT

This study aims to assess how well HIV prevention, treatment, and continuous care have been integrated into the Kano State Contributory Healthcare Management Agency (KSCHMA) scheme and to examine the effects on access to healthcare, financial protection, and financial sustainability.

Methods: A convergent mixed-methods study was carried out in 27 healthcare facilities located in three senatorial zones of Kano State, Nigeria. Quantitative data were gathered from people living with HIV (PLHIV), and qualitative data were obtained via key informant interviews (KIIs) with eight administrators of the Kano State HIV Care and Management Agency (KSCHMA) and 16 facility managers. The areas covered were financial protection, service quality, operational efficiency, and scheme solvency.

Results show that HIV integration reduced the average monthly out-of-pocket expenditure by 72.4 per cent ($p<0.001$). The proportion of people experiencing catastrophic health expenditure fell from 71.3 per cent before integration to 27.0 per cent after integration ($p<0.001$), and the rate of impoverishment dropped from 41.0 per cent to 34.1 per cent ($p<0.001$). The average distance travelled to access care fell from 48 km to 22 km, and 47.8 per cent of patients were able to get their ART refills within their Local Government Area. Viral load suppression rose to 78.2 per cent, quarterly refill interruptions decreased by 13.0 per cent, and patient satisfaction increased to 79.6 per cent ($p<0.001$). Thematic analysis revealed three themes: *Decentralisation as an Access Catalyst*, indicating greater use of primary care; *Liquidity Constraints and Claims Friction*, since 60 per cent of managers reported severe delays in reimbursement (69 days), which led to non-ART stockouts; and *The Actuarial Cliff*, which is marked by an unsustainable HIV claims-to-premium ratio of 2.24 in the face of fixed premiums, lifelong monitoring costs, and changes in donor support.

Conclusion: Incorporating HIV care into the state's social health insurance system enhances financial protection and access. For the programme to be sustainable, it is necessary to carry out actuarial re-basing, provide state subsidies (including those from the BHCPF) and simplify the claims processing.

Keywords: HIV/AIDS; Universal Health Coverage; Social Health Insurance; Financial Sustainability; Kano State; Evaluation Indicators; Health Financing.

INTRODUCTION

The global response to HIV is currently undergoing a fundamental shift, moving from vertically funded, donor-reliant emergency response systems to more integrated national health systems supported domestically.[1] In Sub-Saharan Africa (SSA) as historical funding from global mechanisms such as the Global Fund and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) contracts, national and state governments are challenged to integrate HIV services into broader Universal Health Coverage (UHC) architectures [2,3].

Nigeria has the second-highest global burden of HIV, with approximately 1.9 million people living with HIV. [4] In the country, Kano State forms a key aspect of the public health situation. Since it is the most populous state in northern Nigeria, it has to deal with a heavy burden of HIV alongside severe constraints in the delivery of healthcare services.[5] In the past, HIV services were delivered through vertical care facilities heavily subsidised by external donors. [2,3] While effective for clinical management, this vertical approach fostered fragmented service delivery, extreme vulnerability to international donor funding shifts, and indirect out-of-pocket expenses (OOPE) for patients who had to travel long distances to reach the centralised secondary facilities, and left the system extremely vulnerable to changes in international donor funding.[1]

Because of the shortfall in health financing and the rapid progress being made towards universal health coverage, the Kano State government set up KSCHMA in 2016 through appropriate legislation. The agency has become one of the most dynamic of Nigeria's State Health Insurance Schemes (SHIS), with enrolment increasing from 497,262 in June 2023 to 1,187,119 by May 2026, a rise of 139 per cent. [6,7] KSCHMA has been the first to integrate HIV prevention, treatment and lifelong care into the state's contributory health insurance scheme. [6] A major aspect of this expansion has been the intentional enrolment of vulnerable groups, including people living with HIV (PLHIV), into the scheme via the Vulnerable Healthcare Programme.[7]

The way HIV services are being integrated into KSCHMA aligns with the National Blueprint for the integration of HIV into State Health Insurance Schemes, a document that guides Nigeria's 36 states on integrating HIV services into their insurance benefit packages.[8] This national framework recommends a minimum range of HIV services, comprising both facility-based and

community-based HIV testing and counselling, as well as ART and the management of opportunistic infections.

Although integrating HIV care into the state's social health insurance scheme platforms is theoretically promising, little empirical evidence is available to assess multi-stakeholder implementation using standardised evaluation indicators. A significant gap remains in empirical evidence on the impact of this kind of integration. In particular, there is limited research into:

1. The impact of state-level health insurance integration on access to healthcare among PLHIV
2. The effects of financial protection of health insurance for PLHIV in Nigeria
3. The quality of healthcare integrated HIV services delivered through health insurance schemes
4. The satisfaction of PLHIV enrolled in health insurance schemes
5. The sustainability of HIV integration in the context of declining donor support

This study addresses these gaps by providing empirical evidence on the impact of KSCHMA's HIV integration in Kano State. Policy change was assessed using indicators across four main areas: **financial protection**, **service delivery and clinical outcomes, operational and administrative efficiency**, **and fiscal and scheme-level solvency.** The findings aim to inform policymakers in developing and maintaining HIV financial sustainability plans in low- and middle-income countries (LMICs).

Core Evaluation Indicator Framework

To assess integration from multiple angles, we created a standard Evaluation Indicator Matrix covering key areas:

<<INSERT FIGURE 1>>

.

1. **The Financial Protection Domain includes the average** monthly out-of-pocket expenditure (covering indirect and ancillary costs); the rate of catastrophic health expenditure (defined as health spending exceeding 10% of total household income); and the rate at which people fall into poverty as a result of receiving HIV care.
2. **Clinical and Service Coverage Domain:** Average travel distance and time to the closest accredited ART center. Quarterly ART refill interruption rate. Viral load suppression rate (less than 50 copies/ml). Patient satisfaction score (0-100 visual analogue scale).
3. **Operational and Administrative Efficiency:** we looked at the average time from claim submission to reimbursement, the percentage of facilities with stockouts of non-ART supplies, and how many facilities use electronic claims systems.
4. **Fiscal and Scheme Solvency Area:** The **c**laims-to-premium loss ratio for HIV care, comparing the proportion of funding from donors with that from state tax-funded subsidies (BHCPF).

METHODS

Study Design and Setting

A convergent parallel mixed-methods (cross-sectional and phenomenological) design was used across 27 randomly selected health facilities in 3 senatorial districts of Kano State, Nigeria (October 2025- December 2025). Three Local Government Areas (LGAs), secondary facilities, and 6 Primary Healthcare (PHC) facilities from each senatorial district were selected.

Study Population and Sampling

Quantitative Participants

The study engaged three distinct target populations:

- **Adult PLHIV (≥ 18 years):** Enrolled in the KSCHMA scheme for ≥ 6 months and receiving ART. A multi-stage cluster sampling technique stratified by facility tier was used to select 422 respondents across 27 facilities as follows;

1. **Stage 1:** (LGA selection). Among the 44 LGAs, 9 were selected at random using a random number table from an alphabetical list, 3 from each of the 3 Senatorial districts.
2. **Stage 2:** (Facility Selection). A total of 27 KSCHMA-accredited facilities were selected with simple random sampling stratified by tier.

    a) Nine (9) Secondary (General hospitals) facilities: One facility was selected from each of the three LGAs in each of the three senatorial districts, giving a total of nine secondary facilities.
    b) Eighteen (18) Primary (PHCs) facilities: Two PHCs were selected from each of the three selected LGAs in each of the three senatorial districts, for a total of 18 PHCs.
3. **Stage 3**: (Participant selection); Given that the number of KSCHMA enrollees in the secondary healthcare facilities is approximately twice that of the PHCs, a corresponding 2:1 allocation of respondents between secondary and primary healthcare facilities was applied. Within each facility, respondents were selected systematically from the KSCHMA enrollee register, using a sampling interval determined by the number of eligible enrollees and the facility-specific sample allocation.

Qualitative Participants

- **KSCHMA Administrators and Facility Managers:** A total of 24 key informants were purposively selected for key informant interviews (KIIs), comprising eight KSCHMA administrators, including executive leaders, actuarial planning officers, and claims-processing directors, and 16 facility managers overseeing PHCs and general hospitals providing integrated HIV services under the KSCHMA scheme.

Sample Size Determination

Quantitative Sample

Sample size (n) was calculated using Cochran's formula for single proportions in cross-sectional studies.

$$n = \frac{Z^2 pq}{d^2}$$

Where:

- Z = 1.96 (Standard normal deviation at 95% Confidence Interval)
- p = Assuming p is 50% 0.50 (proportion of PLHIV enrolled in KSCHMA).
- d = 0.05(Margin of error, set at 5%)

$$\text{n} = \frac{1.96^2 \times 0.5(1 - 0.5)}{0.05^2}$$

n= 3.8416 x 0.5 x 0,5/ 0.0025 = 384

10% non-response was added n = 384/0.9 = 422 respondents were selected.

Data Collection & Instruments

- **Quantitative:** Structured questionnaire administered to PLHIV capturing demographic profiles, monthly OOPE, CHE incidence, travel metrics, adherence rates, and satisfaction scores pre- and post-integration.
- **Qualitative:** Semi-structured Key Informant Interview (KIIs) guides administered to administrators and facility managers, focusing on financial liquidity, risk-pooling mechanics, reimbursement timelines, supply chain stability, claims-to-premium ratios, and policy implementation hurdles.

Data Analysis

The quantitative data were cleaned, kept on password-protected computers, and analysed with IBM SPSS version 26 (IBM Corp. USA). Descriptive statistics were used to summarise the baseline demographic information and the evaluation indicators. For the financial and operational measures taken before and after integration, paired t-tests and Wilcoxon signed-rank tests (in the case of continuous non-parametric variables) were carried out. Proportional outcomes (such as the incidence of CHE, the rates of missed refills and viral load suppression) were analysed using Chi-square tests, and a p value less than 0.05 was taken to indicate statistical significance. The qualitative audio transcripts were transcribed exactly as they were, translated from Hausa when needed, and examined through thematic framework analysis using NVivo (version 12). The qualitative codes were checked against the findings from the quantitative indicators.

Ethical Considerations

Ethical approval was secured from the Kano State Health Research Ethics Committee (approval number NHREC/17/03/2018) and written informed consent was received from each participant, with confidentiality being kept by anonymising all the participants' identification tags.

RESULTS

1. Sociodemographic Characteristics of the PLHIV (n=422)

Table 1: Revealed that majority of the participants were 287(68.0%) young adults, females 288(68.2%), resides in urban areas 256(60.7%) and are from the formal public sector 154(36.4%) with monthly income 248(58.8%) less than the country’s minimum wage and had been on ART for more than seven years 248 (58.8%).

<< INSERT TABLE 1>>

2. Evaluation Domains 1 & 2: Financial Protection, Access, and Clinical Indicators among PLHIV

Monthly out-of-pocket expenditure decreased substantially following the integration, from a median of ₦4,544 (IQR: ₦2,654) at baseline to ₦1,256 (IQR: ₦1,000) post-integration, representing an approximately 72.4% reduction. The difference was statistically significant (Wilcoxon signed-rank test, $Z = -17.773$, $p < 0.001$).

CHE status changed significantly between the pre- and post-integration assessments (McNemar exact test, $p < 0.001$). CHE positivity decreased from 71.3% (301/422) at baseline to 27.0% (114/422) post-integration, representing an absolute reduction of 44.3 percentage points and a 62.1% relative reduction. Among participants whose CHE status changed, 227 transitioned from CHE-positive to CHE-negative, compared with 40 who transitioned from CHE-negative to CHE-positive

The proportion of participants experiencing impoverishment decreased significantly from 41.0% (173/422) at baseline to 34.1% (144/422) post-integration (McNemar exact test, $p < 0.001$). Among the 29 participants who changed status, all transitioned from impoverished to non-impoverished, while none transitioned from non-impoverished to impoverished, indicating a significant improvement in financial protection following the integration. Therefore, the prevalence of impoverishment decreased by approximately 6.9% points, representing a 16.8% relative reduction.

Access to healthcare improved significantly following the integration. Median travel time to the healthcare facility decreased from 22 minutes (IQR: 17) at baseline to 20 minutes (IQR: 9) post-integration ($Z = -8.899$, $p < 0.001$). Similarly, median travel distance decreased from 48 km (IQR: 34) to 32 km (IQR: 22), representing a 33.3% reduction ($Z = -14.894$, $p < 0.001$).

There was a statistically significant reduction in missed ART refills following the integration (McNemar exact test, $p < 0.001$). The proportion of participants who missed ART refills decreased from 27.2% (109/401) at baseline to 14.2% (57/401) post-integration, representing a 47.8% relative reduction. Among participants who changed status, 93 transitioned from missed to non-missed refills, compared with 41 who transitioned from non-missed to missed refills.

Viral load suppression improved significantly following the integration (McNemar exact test, $p < 0.001$). The proportion of participants with viral load <50 copies/mL increased from 47.4% (200/422) at baseline to 78.2% (330/422) post-integration, representing an absolute increase of 30.8 percentage points. Among participants whose viral load suppression status changed, 173 transitioned from unsuppressed to suppressed, whereas 43 transitioned from suppressed to unsuppressed.

Patient satisfaction improved significantly following the integration (McNemar exact test, $p < 0.001$). The proportion of satisfied patients increased from 56.4% (238/422) at baseline to 79.6% (336/422) post-integration, representing an absolute increase of 23.2 percentage points. Among participants who changed satisfaction status, 98 transitioned from being unsatisfied to satisfied, while none transitioned from satisfied to unsatisfied see Table 2.

<<INSERT TABLE 2>>

3. Evaluation Domain 3: Facility-Level Operational Efficiency Indicators

Facility managers supplied audit data that gave us empirical values for operational efficiency indicators. The average delay between claim submission and reimbursement is 69 days (range: 40–68 days), far above the KSCHMA target of 30 days. This causes serious liquidity problems and is directly linked to a 45% stockout rate of non-ART supplies at health facilities, as shown in Table 3.

<<INSERT TABLE 3>>

3. Evaluation Domain 4: Fiscal & Scheme-Level Solvency Indicators

The fiscal indicators used to assess the scheme's long-term solvency were determined through key informant interviews with KSCHMA policy executives and their scheme financial reviews.

The actuarial deficit is reflected in **t**he HIV-specific claims-to-premium ratio of 1.32. This means that current capitation and fee-for-service payment rates are not sustainable without continued external subsidies or increased domestic tax funding, as depicted in Table 4.

<<INSERT TABLE 4>>

4. Qualitative Thematic Analysis: Systemic Enablers and Structural Bottlenecks

When the 24 interviews (24 KIIs) were subjected to thematic analysis, three main themes emerged, representing the operational and policy realities of KSCHMA integration.

Theme 1: Decentralisation as a means of facilitating access (in the area of service delivery). Facility managers noted that by including HIV care in the standard KSCHMA primary care package, the historical vertical silos which had stigmatised and isolated people living with HIV were broken down. The ability of primary health centres to provide ART together with general care meant that both geographic and social barriers were reduced.

*"Before integration, patients from our local government had to travel two hours to Aminu Kano Teaching Hospital just for a routine refill. Now, they pick up their ART at the same PHC where their wives go for antenatal care. It has drastically cut down the transport costs that used to cause defaults and improved disease outcomes."***(KII-04, Secondary facility Medical Director)**

Theme 2: Liquidity Constraints and Claims Friction (Health Financing). Even though clinical successes had been achieved, administrative difficulties had a severely adverse impact on operational efficiency. Facility staff said they were extremely frustrated by the KSCHMA claims assessment process. Quantitative data showed a mean delay in reimbursement of 70 days, a result which was also supported by qualitative evidence as the reason for supply-chain instability.

" When I submit a fee-for-service claim for treating severe opportunistic infections, it takes two to three months to see the money. In the meantime, I cannot restock basic laboratory reagents or non-ART antibiotics. The capitation is simply not enough to cover the gaps.**"(KII-11, PHC Facility Manager)**

"At times, the bottleneck is caused by the need for manual checking of claims at the KSCHMA headquarters. Although there is an electronic system, physical audits are sometimes carried out instead, which causes delays." **(KII-02, KSCHMA Officer)**

Theme 3: The Actuarial Cliff and Donor Transition (Governance & Solvency). From a macro-financing perspective, KSCHMA administrators said they were deeply concerned about the scheme's long-term financial solvency. The thematic data pointed to the existence of an impending "actuarial cliff", which is a situation in which international donors (such as PEPFAR) withdraw their funding from high-cost vertical programmes (including reagents and second-line ART) before the country's tax base is able to take on these costs.

*"Our premium structure was fundamentally designed around basic primary care: malaria, typhoid, safe delivery. It was not actuarially modelled to carry the lifelong burden of chronic viral load monitoring and second-line antiretrovirals. With an HIV claims-to-premium ratio pushing past 1.3, we are structurally cross-subsidising at an unsustainable rate."***(KII-05, KSCHMA officer)**

"The fact is that we rely heavily on donations to finance the actual ART. If the Global Fund and PEPFAR complete their transition without the State Assembly setting aside a large amount from the Basic Health Care Provision Fund specifically for chronic care, the scheme's central risk pool will collapse under the weight." (**KII-01, KSCHMA officer)**

DISCUSSION

Using a structured matrix of evaluation indicators, this study provides clear empirical evidence on operational achievements and fundamental structural weaknesses in integrating HIV care into KSCHMA in Kano State. Moreover, combining quantitative performance indicators with qualitative thematic analysis provides a thorough evaluation of HIV integration in KSCHMA. The research tackles the shortcomings that exist in the monitoring of performance and in assessing the impact of the implementation of government policy, a situation which is generally absent in Sub-Saharan Africa (SSA). [9]

We reported significant changes in domains 1 and 2 of our evaluation matrix. The average out-of-pocket expenditure (OOPE) among people living with HIV (PLHIV) in this study was ₦4,544, which is in line with the expected benchmark of less than ₦5,000. This is because PLHIV have received support from external donor funding for many years. After HIV was incorporated into the KSCHMA scheme, there was a meaningful decrease in monthly OOPE, the incidence of catastrophic health expenditure (CHE), and the rate of impoverishment, with all financial protection indicators showing statistically significant results. On the other hand, Yakubu et al. also found reductions in out-of-pocket expenditure and in catastrophic health expenditure.[10] Therefore, social health insurance can protect households from the financial impact of unexpected medical bills.

The theme of *Decentralisation as an access catalyst* provides a qualitative context for the quantitative results showing a reduction in travel distance (from 48 to 22 km) and a halving of out-of-pocket expenses. By providing care via accredited primary health care centres instead of relying on centralised tertiary facilities, KSCHMA has successfully used its social health insurance scheme to promote equity and access. [9,11] This is in agreement with the findings of Onwujekwe *et al.* [11] in three states in Nigeria, who found that more than 90% of the respondents believed

that decentralising ART to PHCs would be advantageous for controlling HIV in Nigeria. Yet some participants thought that facilities near people's homes might lead to fear of disclosure and stigma. [11] On the other hand, John et al. found that uptake of decentralised ART decreased by 3% in Cross River and by 9% in Kaduna in April 2011.[12] Hence, the decentralisation of ART services does not lead to greater access to ART care; instead, it results in reduced access to laboratory services. It therefore follows that decentralisation should be coupled with efficient financial support for all services and with targeted behaviour change for those who fear disclosure and stigma.

Yet the identification of *Liquidity Constraints and Claims Friction* shows serious dangers for provider retention. A mean delay of 70 days in reimbursement threatens operational viability. We documented that facility managers have pointed out that, when reimbursement through social insurance comes to a standstill, the facilities are forced to ration their non-ART supplies, thereby directly endangering the comprehensive care model by taking away financial protection. Likewise, it has been documented that the worst-off households suffered the greatest burden from health expenditure. [13]

The *Actuarial Cliff* theme aligns with the quantitative solvency criterion, which is the claims-to-premium ratio of 2.24. We had stated that administrators said that, without structural reforms, state social health insurance systems would not be able to fund vertical HIV programmes on their own. The regional findings indicate that achieving universal health coverage will require a hybrid financing model that combines re-based premiums with specific tax revenues, such as Nigeria's BHCPF, to help meet the high costs of treating chronic diseases. [9,14,15] On the basis of our assessment, we recommend the following policy actions:

- **Automation of claims adjudication:** Strict adherence to a 30-day reimbursement target to maintain the facility's liquidity.

- **Re-basing the actuarial calculations and setting up dedicated funding:** adjust the KSCHMA premium structures on the basis of chronic-care modelling and obtain legislative mandates to ensure that more than 30% of the BHCPF is allocated specifically to HIV diagnostics and the management of opportunistic infections. Additionally, bring the HIV claim-to-premium ratio down to below 0.85.
- **Achieve greater than 95% viral load suppression;** while maintaining decentralised primary care empanelment and improving supply-chain logistics for drugs used to treat non-ART opportunistic infections.

CONCLUSION

Integrating HIV care into KSCHMA has led to major improvements in financial protection, service access, patient satisfaction, and viral suppression for adults living with HIV in Kano State. However, to ensure long-term sustainability, it is important to keep monitoring key operational and financial indicators, especially by reducing claims reimbursement delays and addressing the actuarial deficit with dedicated domestic tax funding as global donor support declines.

List of Abbreviations

ART – Antiretrovirals

BHCPF – Basic Health Care Provision Funds

CHE – Catastrophic Health Expenditure

FFS – Fee-for-Service

IDIs – In-depth Interviews

KSCHMA – Kano State Contributory Health Management Agency

OOPE- Out of Pocket Expenditure

PLHIV – People Living with HIV

DECLARATIONS

Ethics Approval and informant consent

The Kano State Health Research Ethics Committee, Ministry of Health, granted the necessary ethical clearance, with approval reference (NHREC/17/03/2018). Written informed consent was obtained from all the participants, and permission was also obtained from both the KSCHMA and the Ministry of Health to use the de-identified KSCHMA enrollee datasets.

Competing Interests

The authors have nothing to declare related to financial or institutional interests.

Consent for publication

Not applicable

Funding

This study received no funding from any agency operating in the public, commercial, or not-for-profit sectors. The principal author and KSCHMA funded the entire project.

Data Availability:

The data supporting the findings of this study may be obtained from the corresponding author on reasonable request and will be made available once approval has been granted by KSCHMA and the Kano State Ministry of Health.

Acknowledgements

The authors thank the management and staff of the Kano State Contributory Healthcare Management Agency (KSCHMA), the Kano State Ministry of Health, the facility administrators, the key informants, and the PLHIV who took part in this study.

Authors contributions

RAM, ZA – Research conceptualisation, proposal writing, securing proposal approval

ZA, AYH, ALO – Data collection and analysis
RAM, ZA, ALO – Manuscript writing, review and final approval

All authors give final approval for publication

REFERENCES

1. Kates J, Wexler A, Lief E. Donor government funding for HIV in low- and middle-income countries: can we achieve an AIDS-free generation? 20th International AIDS Conference, July 20–25, 2014, Melbourne, Australia. 2014;(July):98
2. Olakunde BO, Adeyinka DA. Test-and-treat approach to ending HIV epidemic in Nigeria: Current status and future prospects of domestic funding. HIV AIDS Rev. 2017;16(4):205–11.
3. Olakunde BO, Ndukwe DC. Improved Domestic Funding Enhances the Sustainability of HIV/AIDS response in Nigeria. Ann Glob Health. 2015;81(5):684–8.
4. Global HIV epidemiology and response data from UNAIDS [Internet]. 2020 [cited 2022 Oct 13]. Available from: https://aidsinfo.unaids.org/
5. Federal Ministry of Health of Nigeria. National HIV and AIDS strategic framework 2019–2021: Transitioning to sustainable domestic financing. Abuja: Federal Ministry of Health, 2020
6. The Ministry of Health, Kano State Government, issued the operational guidelines of the Kano State Contributory Healthcare Management Agency on integrating vulnerable groups and priority health interventions in 2020.
7. KSCHMA. KSCHMA Strategic Plan Mid-Term Review Workshop. 2025
8. Kano State Contributory Healthcare Management Agency. USAID Delegation Visited Kano, Commends KSCHMA for the Enrollment of PLHIV into the Scheme. 2024

9. Ifeagwu SC, Yang JC, Parkes-Ratanshi R, Brayne C. Health financing for universal health coverage in Sub-Saharan Africa: a systematic review. Glob Health Res Policy. 2021 Mar 1;6(1):8. doi: 10.1186/s41256-021-00190-7.

10. Yakubu IK, Ibrahim F I, Abdu AH, Ahmad H, Ibrahim MA, Musa KU. Financial Protection and National Health Insurance Scheme Enrollment in Nigeria.*International Journal of Intellectual Discourse*. 2026;*9*(1). Retrieved from https://ijidjournal.org/index.php/ijid/article/view/1057

11. Onwujekwe O, Chikezie I, Mbachu C, Chiegil R, Torpey K, Uzochukwu B. Investigating client perception and attitude to decentralisation of HIV/AIDS treatment services to primary health centres in three Nigerian states. Health Expect. 2016;19(5):1111-20. doi: 10.1111/hex.12403.

12. Johns B, Baruwa E. The effects of decentralising anti-retroviral services in Nigeria on costs and service utilisation: two case studies. Health Policy Plan. 2016 Mar;31(2):182-91. doi: 10.1093/heapol/czv040.

13. Onwujekwe O, Hanson K, Uzochukwu B (2012) Examining Inequities in Incidence of Catastrophic Health Expenditures on Different Healthcare Services and Health Facilities in Nigeria. PLoS ONE 7(7): e40811. doi: 10.1371/journal.pone.0040811

14. Intyre D, Meheus F, Rottingen J-A. What level of domestic government health expenditure should we aspire to for universal health coverage? Health economics, policy, and law. 2017;12(2):125–37. 21.

15. McIntyre D, Obse AG, Barasa EW, Ataguba JE. Challenges in financing universal health coverage in sub-Saharan Africa. In: *Oxford Research Encyclopedia of Economics and Finance*; 2018.

Table 1: Sociodemographic Characteristics

Variable	Frequency (n=422)	Percentage (%)
Age group (Years)		
18-30	96	22.7
31-49	287	68.0
≥ 50	39	9.3
Sex		
Male	134	31.8
Female	288	68.2
Place of Residence		
Rural	166	39.3
Urban	256	60.7
Current Facility		
Primary	211	50.0
Secondary	211	50.0
Employment Type		
Formal Public	154	36.4
Formal Private	115	27.3
Informal/Self	115	27.3
Unemployed/Dependent	38	9.0
Income (₦)		
< 70,000	248	58.8
≥ 70,000	174	41.2
Duration on ART (Years)		
< 3	77	18.2
3-7	97	23.0
>7	248	58.8

Table 2: Key Evaluation Indicator Matrix: Pre- vs. Post-KSCHMA Integration (n= 422)

Evaluation indicator	Specific indicator	Pre-Integration	Post-Integration	Target Benchmark	Test Statistics	p-value
Financial Protection	Mean OOPE (₦)	4,544(2,654)	1,256(1,000)	< ₦ 5,000	-17.773*	<0.001
	CHE incidence (>10% income)	301(71.3%)	114(27.0%)	<15,0%	Mc Nemar	<0.001
	Impoverishment rate due HIV care	173(44.1%)	144(34.1%)	<10%	Mc Nemar	<0.001
Access and Coverage	Mean travel time to facility (mins)	22(17)	20(9)	< 30,0	-8.899*	<0.001
	Mean travel distance in (km)	48(34)	32(22)	<10.0	-14.894*	<0.001
Clinical Outcomes	Missed ART refill (3/12) interruption	109(27.2%)	57(14.2)	<5%	Mc Nemar	<0,001
	Viral-Load suppression (<50 copies/ml)	200(47,4%)	330(78.2%)	≥95%	Mc Nemar	<0.001
	Overall patient satisfaction	238(54.6%)	336(79.6%)	>80%	Mc Nemar	<0.001

*z-score for related sample Wilcoxon signed-rank test, CHE- Catastrophic Health Expenditure

Table 3: Operational Efficiency Evaluation Indicators Across Accredited Facilities

Operational Indicator	Primary Facilities (n=18)	Secondary Facilities (n=9)	Overall Performance	Benchmark Standard
Mean Claims reimbursement lag (days)	74(40, 60)	65 (32, 56)	69 (40, 68)	30 days
Proportion of reimbursement delay > 60 days	50.0%	43.0%	47.0%	0.0%
Non-ART consumables stockout incidence	55.0%	40.0%	45.0%	<10.0%
Electronic claims system adoption rate	50.0%	89.0%	70.0%	100.0%
Perception of Capitation adequacy (routine OI)	40.0%	45.0%	40.0%	>80.0%

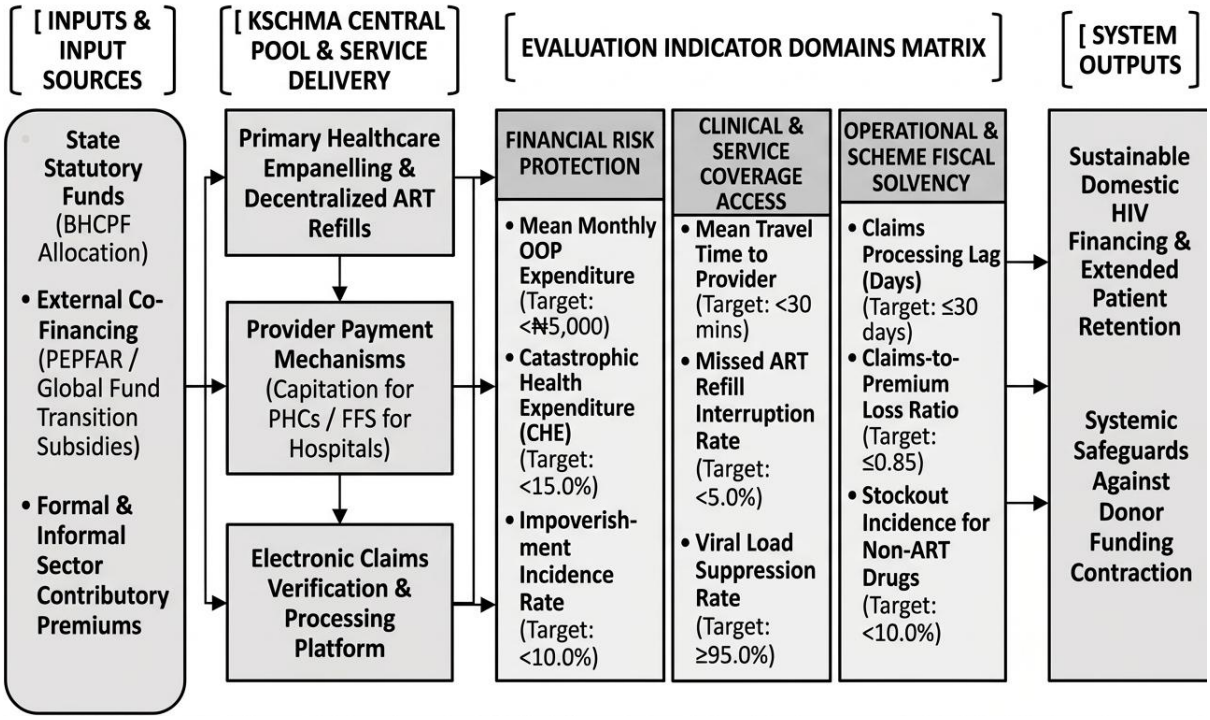
OI- opportunistic infection, ART- Antiretroviral therapy

Table 4: Scheme- level Fiscal Solvency and Sustainability indicators (KSCHMA level)

Fiscal Scheme Indicator	Observed value	Recommended Benchmark	Interpretation/ Risk profile
HIV Care Claim-to Premium ratio	2.24 (1.81, 2.46)	0.85	**Actuarial Deficit:** Medical claims for HIV/OI care exceed allocated premium contributions by 124%.
External Donor Subsidy dependence	80.0%	<20.0%	**High Vulnerability:** Over 80.0% of commodity/diagnostic costs remain off-budget (donor supported).
State Statutory Subsidy Allocation (BHCPF)	11.4%	> 30.0%	**Under-funding:** Domestic tax ring-fencing falls short of covering chronic disease cross-subsidies.
Informal Sector Population Capture rate	4.4%	> 50%	**Narrow Risk Pool:** Scheme remains heavily reliant on formal sector payroll deductions.

BHCPF- Basic Health Care Provision Fund

Figure 1: Evaluation framework for KSCHMA integration of HIV care.



Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- QuestionnaireofHIVIntegration.docx