



## FACTORS ASSOCIATED WITH HIV/AIDS HEALTHCARE ACCESS AMONG PLHIV: A SYSTEMATIC REVIEW AND META-ANALYSIS

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### ABSTRACT

Access to HIV/AIDS health services remains a major challenge in many developing countries. Factors such as health literacy, insurance coverage, health service availability, and psychosocial barriers influence healthcare utilization among people living with HIV/AIDS (PLHIV). This study aimed to analyze factors associated with access to health services among PLHIV through a systematic review and meta-analysis. A systematic review and meta-analysis were conducted using articles published between 2019–2024 from databases including PubMed, Scopus, ScienceDirect, and Google Scholar. 5094 articles were obtained, of which only 5 articles were used. The meta-analysis showed that PLHIV with good knowledge had significantly better access to healthcare services compared with those with poor knowledge (POR=2.03; 95% CI: 1.19–3.46; p=0.010). Health insurance ownership was also significantly associated with healthcare access (POR=0.83; 95% CI: 0.74–0.93; p=0.002). Narrative synthesis indicated that healthcare accessibility, healthcare worker support, patient perceptions, stigma, and financial barriers strongly influenced viral load monitoring and ART adherence. Knowledge and health insurance ownership are important determinants of healthcare access among PLHIV. Strengthening HIV health literacy, improving healthcare financing systems, and expanding accessible HIV services are essential to improve continuity of care and viral load monitoring.

Keywords: HIV/AIDS; healthcare access; meta-analysis; systematic review; viral load

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## INTRODUCTION

Human Immunodeficiency Virus Infection and Acquired Immunodeficiency Syndrome remains a major global public health problem that affects morbidity, mortality, and quality of life worldwide. Despite significant advances in antiretroviral therapy (ART), many people living with HIV/AIDS (PLHIV) still experience barriers in accessing healthcare services, particularly viral load monitoring and long-term HIV treatment. Limited access to healthcare services may increase the risk of treatment failure, poor viral suppression, disease progression, and HIV transmission. World Health Organization reported that improving access to HIV services is essential to achieving global HIV control targets and ending the AIDS epidemic.

Access to healthcare services among PLHIV is influenced by multiple factors, including health literacy, socioeconomic status, healthcare availability, stigma, healthcare worker support, and financial protection through health insurance. Knowledge regarding HIV infection, ART adherence, and viral load monitoring plays an important role in encouraging patients to utilize healthcare services regularly. Individuals with adequate HIV-related knowledge are more likely to understand

the benefits of routine monitoring and long-term treatment adherence. Previous studies also demonstrated that limited health literacy contributes to delayed healthcare utilization and poor ART adherence among PLHIV (Lubega et al., 2022; Kemper et al., 2023).

Financial barriers are another important determinant of healthcare utilization among PLHIV. HIV/AIDS requires lifelong treatment and continuous laboratory monitoring, which may create a substantial economic burden for patients. Health insurance coverage can reduce out-of-pocket expenses and improve continuity of HIV treatment and monitoring services. Studies conducted in several developing countries showed that uninsured patients were less likely to access HIV services regularly due to transportation costs, healthcare expenses, and limited healthcare infrastructure (Setiawan et al., 2022; Thinn et al., 2019). In addition, healthcare system factors such as laboratory availability, healthcare worker capacity, communication quality, and patient-centered care also influence healthcare utilization among PLHIV. Negative patient experiences, social stigma, and discriminatory attitudes from healthcare providers may reduce patients' willingness to continue HIV treatment and routine viral load testing. Conversely, supportive healthcare environments and effective communication from healthcare workers may improve treatment adherence and patient satisfaction (Karoli et al., 2023; Nanyeenya et al., 2024).

Although many studies have investigated factors affecting HIV healthcare utilization, evidence regarding the combined effect of knowledge and health insurance ownership on healthcare access among PLHIV remains limited. Therefore, this study aimed to systematically review and analyze factors associated with healthcare access among PLHIV using systematic review and meta-analysis approaches. The findings of this study are expected to support evidence-based strategies for improving HIV healthcare services and strengthening HIV/AIDS control programs globally.

## **METHOD**

### **Study Design**

This study used a systematic review and meta-analysis design to examine factors associated with healthcare access among people living with HIV/AIDS (PLHIV), particularly knowledge and health insurance ownership. The study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparent and systematic reporting. Systematic review methods were used to identify, evaluate, and synthesize relevant evidence, while meta-analysis was conducted to obtain pooled effect estimates from eligible quantitative studies.

### **Literature Search Strategy**

Literature searches were conducted systematically through PubMed, Scopus, ScienceDirect, and Google Scholar databases for articles published between 2016 and 2026. Search terms were developed using Boolean operators ("AND" and "OR") based on Population, Exposure, and Outcome (PEO) components. The keywords included: ("HIV" OR "PLHIV" OR "people living with HIV") AND ("Viral Load") AND ("healthcare access" OR "health service utilization") AND ("knowledge" OR "awareness") AND ("health insurance" OR "insurance coverage" OR "BPJS" OR "JKN").

### **Inclusion and Exclusion Criteria**

Studies were included if they: (1) were published between 2016–2026; (2) used observational designs; (3) involved PLHIV populations; (4) analyzed healthcare access, viral load services, knowledge, or health insurance; and (5) reported odds ratio (OR), adjusted odds ratio (AOR), or sufficient statistical data. Review articles, editorials, commentaries, and studies without full text or statistical outcomes were excluded.

## Quality Assessment and Data Extraction

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist according to study design. Articles scoring more than 50% were considered eligible. Extracted data included author, year, country, study design, sample size, odds ratio, confidence interval, p-value, and main findings.

## Data Analysis

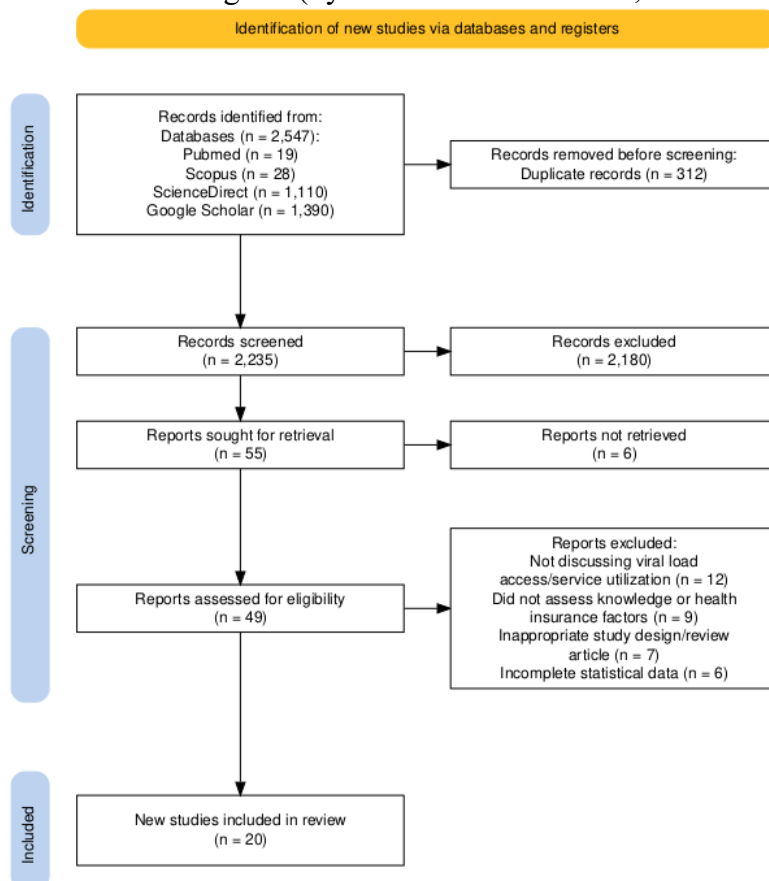
Meta-analysis was performed using Review Manager (RevMan) version 5.4.1 with the Generic Inverse Variance method. Odds ratio (OR) with 95% confidence interval (CI) was used as the pooled effect measure. Fixed-effect models were applied when heterogeneity was low ( $I^2 < 50\%$ ), whereas random-effect models were used for high heterogeneity ( $I^2 \geq 50\%$ ). Publication bias was evaluated using funnel plots.

## RESULT

### Study Selection

The literature search identified studies from multiple databases. After removing duplicates and screening titles and abstracts, eligible full-text articles were reviewed according to inclusion and exclusion criteria. Fifteen studies were included in the systematic review, while five studies met the criteria for quantitative meta-analysis.

Figure 1. PRISMA Flow Diagram (Systematic review n = 15, Meta Analysis n = 5)



PRISMA 2020 flow diagram of study selection process for the systematic review and meta-analysis (n=20). A total of 15 studies were included in the systematic review, while 5 studies met the eligibility criteria and were included in the quantitative synthesis (meta-analysis). The included studies were mainly conducted in low- and middle-income countries (LMICs), especially in Sub-Saharan Africa and Southeast Asia. Most studies used cross-sectional, cohort, mixed-methods, or qualitative designs.

### Characteristics of Included Studies

Table 1  
Characteristics of Included Studies (n=5)

Author	Country	Design	Main Findings
Apollo et al. (2021)	Zimbabwe	Mixed methods	Low viral load coverage
Setiawan et al. (2022)	Indonesia	Cross-sectional	Insurance improved HIV service utilization
Mnzava et al. (2023)	Tanzania	Cohort	Decentralization improved VL access
Karoli et al. (2023)	Tanzania	Mixed methods	Supportive healthcare workers improved adherence
Lubega et al. (2022)	Uganda	Qualitative	Low viral load literacy among PLHIV

Overall, studies consistently reported that viral load access remained suboptimal due to barriers such as low health literacy, stigma, limited laboratory facilities, delayed laboratory results, and healthcare system constraints.

### Quality Assessment

Most included studies showed good methodological quality with JBI scores ranging from 6-9. Studies generally demonstrated clear inclusion criteria, valid measurements, and appropriate statistical analyses.

### Meta-Analysis Results

#### Knowledge and Healthcare Access

Three studies were included in the meta-analysis of knowledge and healthcare access among PLHIV.

Table 2  
Meta-Analysis of Knowledge

Study	OR	95% CI
Nugroho & Purwanto	1.008	0.851–1.194
Widiahandayani et al.	13.363	5.6–31.46
Sabo et al.	1.60	1.55–1.67

The pooled analysis showed that higher knowledge was significantly associated with better healthcare access among PLHIV (pooled OR = 2.03; 95% CI: 1.19–3.46; p=0.010). Heterogeneity was very high ( $I^2 = 96\%$ ), therefore a random-effect model was used.

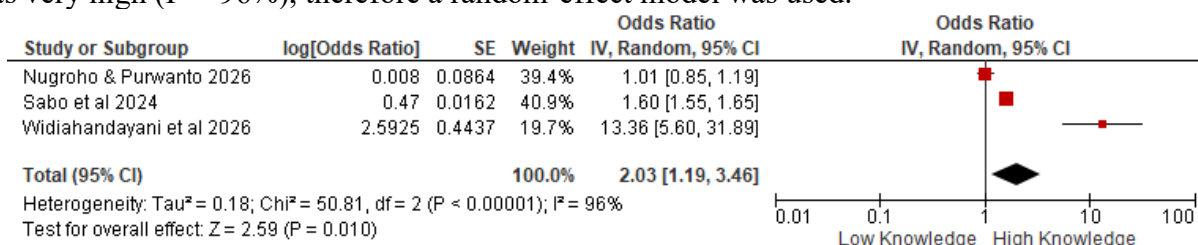


Figure 2. Forest Plot of Knowledge

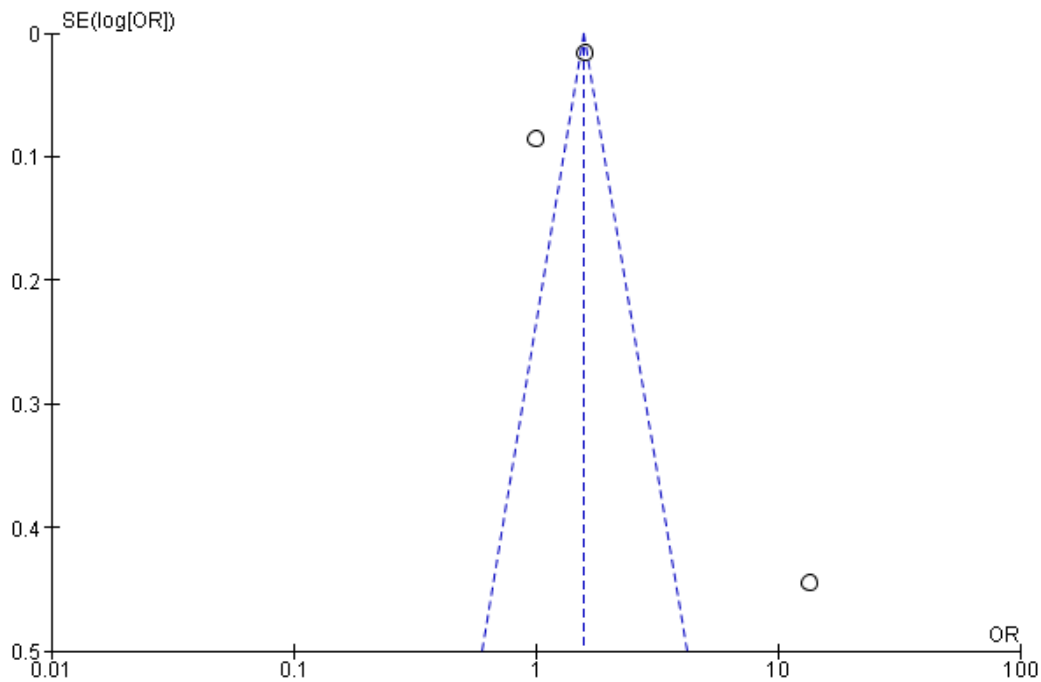


Figure 3. Funnel Plot of Knowledge

The funnel plot demonstrated asymmetrical distribution, indicating possible publication bias and substantial variation between studies.

**Health Insurance and Healthcare Access**

Three studies analyzed the relationship between health insurance ownership and healthcare access.

Table 3  
Meta-Analysis of Health Insurance

Study	OR	95% CI
Nugroho & Purwanto	0.776	0.663–0.907
Edet et al.	0.91	0.76–1.08
Mulyawijaya et al.	0.679	0.227–2.036

Meta-analysis showed that health insurance ownership significantly improved healthcare access among PLHIV (pooled OR = 0.83; 95% CI: 0.74–0.93; p=0.002). Heterogeneity was low (I<sup>2</sup> = 0%), therefore a fixed-effect model was applied.

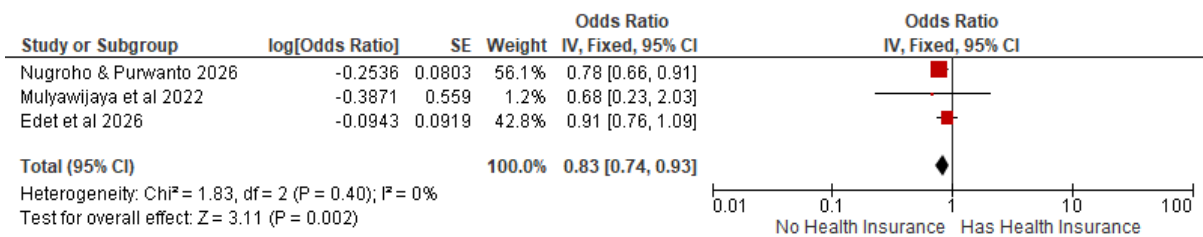


Figure 4. Forest Plot of Health Insurance

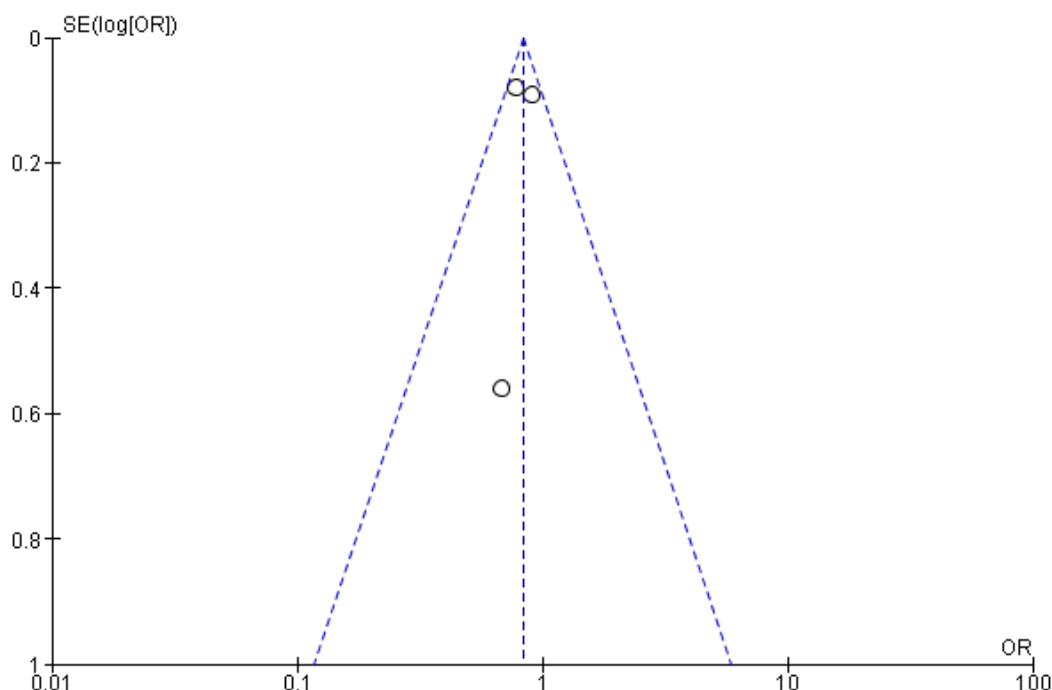


Figure 5. Funnel Plot of Health Insurance

The funnel plot appeared relatively symmetrical, suggesting minimal publication bias.

## DISCUSSION

### Association Between Knowledge and Healthcare Access

This meta-analysis demonstrated a significant association between knowledge level and healthcare access among people living with HIV/AIDS (PLHIV). The pooled analysis showed that PLHIV with good knowledge were approximately twice as likely to access healthcare services compared with those who had limited knowledge (POR=2.03; 95% CI: 1.19–3.46;  $p=0.010$ ). Adequate knowledge regarding HIV, antiretroviral therapy (ART), and viral load monitoring increases patients' awareness of the importance of routine healthcare utilization and treatment adherence. Patients with better health literacy are more likely to understand the benefits of viral suppression, prevention of disease progression, and reduction of HIV transmission risk. (Lubega et al., 2022; Kemper et al., 2023; Thinn et al., 2019).

These findings are consistent with the Health Belief Model, which explains that health behaviors are influenced by perceived benefits and perceived barriers to healthcare utilization. Patients with sufficient HIV-related knowledge tend to recognize the importance of viral load testing and long-term ART adherence, resulting in better healthcare-seeking behavior. Conversely, limited understanding of HIV management may reduce motivation for routine monitoring and increase the risk of treatment interruption. Several reviewed studies also reported that inadequate viral load literacy remains common among PLHIV. Patients often understand that a low viral load indicates better health but lack deeper understanding regarding drug resistance, low-level viremia, and long-term monitoring. This limited knowledge contributes to poor utilization of healthcare services, especially among adolescents who experience additional psychosocial barriers and HIV-related stigma. (Lubega et al., 2022; Kemper et al., 2023).

Although the association was statistically significant, heterogeneity was high ( $I^2=96%$ ). This variation may be related to differences in population characteristics, healthcare systems, educational levels, and measurement methods across studies. Despite this limitation, all studies consistently suggested that knowledge plays an important role in improving healthcare access among PLHIV. Therefore, strengthening HIV literacy through continuous education, counseling, and community-

based interventions is essential. (Higgins et al., 2023; World Health Organization, 2023; UNAIDS, 2024).

### **Association Between Health Insurance and Healthcare Access**

The meta-analysis also found a significant relationship between health insurance ownership and healthcare access among PLHIV. Individuals without health insurance had lower healthcare access compared with insured patients (POR=0.83; 95% CI: 0.74–0.93; p=0.002). Health insurance reduces financial barriers and facilitates continuous access to ART, laboratory examinations, and routine HIV monitoring. (Setiawan et al., 2022; Thinn et al., 2019) Unlike the knowledge variable, the insurance analysis showed no heterogeneity ( $I^2=0\%$ ), indicating consistent findings across studies and settings. This suggests that financial protection is a universal determinant of healthcare utilization, particularly for chronic diseases such as HIV/AIDS that require lifelong treatment and monitoring. (Higgins et al., 2023).

Studies from Indonesia and Myanmar demonstrated that financial barriers, transportation costs, referral complexity, and indirect medical expenses remain major obstacles to HIV service utilization. Patients with health insurance were more likely to maintain ART adherence and routine viral load monitoring. However, concerns regarding confidentiality and administrative procedures still limited optimal service utilization in some settings. (Setiawan et al., 2022; Thinn et al., 2019) These findings align with the Andersen Behavioral Model, which emphasizes the importance of enabling factors such as financial resources and insurance coverage in healthcare utilization. Strengthening universal health coverage and simplifying healthcare systems are therefore important strategies to improve HIV service access and continuity of care. (Andersen, 1995; World Health Organization, 2023)

### **Narrative Synthesis**

The narrative synthesis identified five major factors influencing viral load service utilization among PLHIV: knowledge, healthcare accessibility, healthcare worker attitudes, patient perceptions, and health insurance coverage. Knowledge and health literacy were consistently associated with better ART adherence and viral load monitoring. Patients with higher educational backgrounds and better HIV literacy demonstrated greater understanding of treatment benefits and were more likely to utilize healthcare services regularly. (Lubega et al., 2022; Meka et al., 2020). Access and availability of healthcare services were the most frequently reported barriers. Geographic limitations, transportation difficulties, inadequate laboratory capacity, reagent shortages, and limited healthcare personnel contributed to delayed viral load testing and reduced service coverage. Decentralization of laboratory services and implementation of dried blood spot (DBS) technology were reported to improve healthcare access in remote areas. (Apollo et al., 2021; Mnzava et al., 2023; Carmona et al., 2017) Healthcare workers also played a critical role in HIV service delivery. Effective communication, supportive attitudes, and adequate counseling improved patient satisfaction, treatment adherence, and engagement in long-term care. In contrast, limited staff capacity and excessive workloads reduced the quality of patient education and psychosocial support. (Nanyeenya et al., 2024; Karoli et al., 2023).

Patient perceptions and stigma strongly influenced healthcare utilization. Fear of discrimination, long travel distances, prolonged waiting times, and anxiety regarding HIV status disclosure reduced patient motivation to seek healthcare services. Adolescents living with HIV were particularly vulnerable because of psychosocial challenges and social stigma. Patient-centered and non-discriminatory healthcare approaches are therefore essential to improve long-term HIV care retention. (Kemper et al., 2023; Meka et al., 2020) Health insurance and financial protection were also important determinants of HIV service utilization. Insurance coverage improved access to ART and laboratory services, while inadequate healthcare financing contributed to service interruptions and reduced continuity of care. Sustainable healthcare financing and integration of HIV services

into universal health coverage programs are essential to support global HIV control strategies. (Setiawan et al., 2022; Apollo et al., 2021)

### Research Implications

This study highlights the importance of improving HIV health literacy, strengthening healthcare financing systems, expanding insurance coverage, and improving viral load service availability. Policies focusing on laboratory decentralization, healthcare worker training, and patient-centered HIV services may improve healthcare access and treatment outcomes among PLHIV.

### Study Limitations

This study had several limitations. First, only a limited number of studies were eligible for quantitative meta-analysis. Second, high heterogeneity was identified in the knowledge variable, indicating substantial variation across studies. Third, most included studies used cross-sectional designs, limiting causal interpretation. Nevertheless, this review provides comprehensive evidence regarding factors associated with healthcare access among PLHIV.

### CONCLUSION

This systematic review and meta-analysis demonstrated that knowledge and health insurance ownership are significantly associated with healthcare access among people living with HIV/AIDS (PLHIV). The narrative synthesis further showed that healthcare availability was the most dominant factor influencing access to viral load services, discussed in 11 out of 15 reviewed articles (73.3%). Other important factors included healthcare worker attitudes and capacity, patient perceptions, stigma, psychosocial support, and healthcare financing systems. Overall, improving HIV health literacy, strengthening healthcare systems, expanding viral load services, and enhancing financial protection are essential strategies to improve continuity of HIV care and support global HIV/AIDS control programs.

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