Integrating Artificial Intelligence into Psychosocial Support for Anxiety and Stress Among People Living with HIV: A Scoping Review and Evidence Map with Implications for Newly Diagnosed Populations in Nigeria

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Abstract

Background: The period surrounding an HIV diagnosis may be accompanied by anxiety, psychological distress, stigma, disclosure concerns and uncertainty about treatment and relationships. In many resource-constrained services, brief counselling remains the principal immediate response, while specialist mental health support is limited. Artificial intelligence-enabled systems and wider digital interventions may extend psychosocial support, but their clinical effectiveness, cultural fit and governance requirements remain uncertain.

Objective: To map verified evidence on AI-enabled and digitally mediated psychosocial interventions relevant to anxiety and stress among people living with HIV, examine the evidence for the immediate post-diagnosis period, and identify implications for research and implementation in Nigeria.

Methods: The review was structured using established scoping-review frameworks and PRISMA-ScR guidance. A standardised charting form captured study design, population, intervention, comparator, duration, psychosocial outcomes, engagement, principal findings and limitations. Interventions were classified as AI-enabled, rule-based or adaptive, or digitally mediated without AI. A reconstructed evidence set of 17 verified publications from 2017 to 2025 was synthesised narratively.

Results: The 17 publications represented nine countries and 16 parent intervention programmes; ten were randomised or pilot randomised trials. Only two publications clearly evaluated AI-enabled systems, three described rule-based, automated or technically unclear systems, and 12 evaluated non-AI digital interventions. Selected non-AI interventions improved anxiety, depression, stigma, coping or self-management, although findings were inconsistent and many studies prioritised feasibility or engagement. Neither AI study established psychosocial effectiveness. No publication specifically evaluated prevention of anxiety disorders or sustained stress reduction during the immediate post-diagnosis period. A Nigerian single-arm study reported fewer depressive symptoms after 48 weeks of SMS reminders plus peer navigation, but it was not AI-enabled and causal attribution was limited.

Conclusion: AI-enabled and other digital interventions may complement HIV care, but current evidence does not establish that AI prevents anxiety disorders or meaningfully reduces stress among newly diagnosed people living with HIV. Nigerian development should begin with culturally co-designed, clinician-supervised, low-data interventions integrated with existing HIV and mental health services, supported by validated outcomes, crisis escalation, equitable access and strong data governance.

Keywords: artificial intelligence, digital mental health, HIV, psychosocial support, anxiety, Nigeria

Introduction

Advances in antiretroviral therapy have transformed HIV into a manageable chronic condition for many people. Nevertheless, HIV continues to impose a substantial global burden. In 2024, an estimated 40.8 million people were living with HIV worldwide, and 1.3 million people acquired HIV during that year [1].

Mental health difficulties are common across the HIV care continuum. A recent meta-analysis

estimated pooled prevalences of 31% for depression, 29% for anxiety, 44% for psychological distress and 47% for HIV-related stigma among people living with HIV [2]. These difficulties can undermine quality of life, treatment engagement, medication adherence, retention in care and viral suppression [3].

The period surrounding diagnosis deserves particular attention. A new HIV diagnosis may activate fear about health, disclosure, relationships, stigma, treatment, finances and mortality. Stress during this period is associated with anxiety and depressive symptoms, although responses vary according to resilience, social support, prior adversity and access to compassionate care [4].

At the point of diagnosis, psychosocial first aid often depends on brief counselling delivered within busy HIV services. In resource-constrained settings, providers may have limited time, specialist mental health preparation or access to referral pathways. This creates a critical service gap when patients may require timely information, normalisation of common reactions, structured coping support and risk assessment [3,5].

Digital tools may help extend these functions through psychoeducation, symptom monitoring, self-management support, peer connection and facilitated referral. Their role should be complementary: they should strengthen, rather than replace, trained counsellors, peer navigators, clinicians and mental health professionals [3,5,6].

Nigeria has a large and geographically diverse HIV programme, but mental health care remains insufficiently integrated into many HIV services. Implementation stakeholders have identified opportunities for task-sharing, staff training, community partnership and use of established HIV platforms, alongside barriers such as stigma, policy fragmentation, workforce shortages and limited implementation evidence [5].

Artificial intelligence refers to computational systems that learn from data or use algorithmic methods to perform tasks that ordinarily require aspects of human intelligence. Relevant applications include machine-learning prediction, natural-language processing, adaptive decision support and generative conversational systems. Many interventions described as “AI-powered”, however, are scripted chatbots or conventional digital programmes. Transparent reporting of architecture, inputs, outputs and human–AI interaction is therefore essential [6].

Existing HIV-related digital interventions have addressed testing, prevention, adherence, self-management, peer support and symptom management. Far fewer studies have evaluated AI-mediated psychosocial support with anxiety or stress as primary outcomes. Evidence is particularly limited for newly diagnosed patients and Nigerian settings. This review retains a diagnosis-period focus, maps verified evidence, distinguishes AI-enabled systems from wider digital interventions and identifies requirements for responsible implementation in Nigeria.

Review Questions

What AI-enabled and digitally mediated psychosocial interventions have been studied among people living with HIV or closely related HIV-service populations?

What anxiety, stress, psychological distress, coping, acceptability, engagement, adherence or related outcomes have been reported?

What methodological, clinical, cultural, infrastructural, ethical and governance limitations are evident?

What evidence gaps must be addressed before implementation among newly diagnosed people living with HIV in Nigeria?

Aim and Objectives

The review aimed to map and critically synthesise evidence on AI-enabled and digitally mediated psychosocial support relevant to anxiety and stress among people living with HIV, and to derive implications for newly diagnosed populations in Nigeria. The objectives were to: (1) distinguish clearly AI-enabled systems from rule-based and non-AI digital interventions; (2) characterise study designs, populations, technologies and psychosocial outcomes; (3) identify methodological, clinical, cultural, infrastructural, ethical and governance gaps; and (4) propose a staged, evidence-led approach to Nigerian research and implementation.

Methods

Design and Reporting Framework

A scoping-review design was selected because the literature spans heterogeneous technologies, populations, outcomes and study designs. The review was structured using the Arksey–O'Malley framework, subsequent methodological refinements and PRISMA-ScR reporting guidance [7–10]. The purpose was to map the field rather than estimate a pooled treatment effect.

Eligibility Framework

Eligibility was organised using the Population–Concept–Context framework. The population comprised adolescents and adults living with HIV and closely related HIV-service populations where an intervention had direct relevance to HIV testing, psychosocial support, linkage, adherence or self-management. The concept comprised AI-enabled conversational agents, machine-learning applications, rule-based or adaptive digital systems, and digitally mediated psychosocial interventions addressing anxiety, stress, depression, distress, coping, stigma, emotional regulation or access to support. The context was unrestricted geographically, with specific attention to low- and middle-income countries and implications for Nigeria. Interventions were not excluded solely because they included human support, because hybrid and clinician-supervised models are directly relevant to safe clinical implementation.

Empirical quantitative, qualitative and mixed-methods publications in English from 2015 to 2025 were considered. Reviews and authoritative

guidance were used only to contextualise the findings and were not counted among the 17 empirical publications.

Information Sources and Search Strategy

The documented search covered PubMed, Scopus, PsycINFO, HINARI, Google Scholar and reference lists. Search concepts combined terms for artificial intelligence and digital health with psychosocial support, anxiety, stress, mental health and HIV. A representative core string was: ("artificial intelligence" OR chatbot* OR "conversational agent*" OR "machine learning" OR "digital mental health" OR mHealth OR telehealth) AND ("psychosocial support" OR counselling OR "mental health intervention*" OR anxiety OR stress OR distress OR coping) AND (HIV OR AIDS OR PLWH OR PLHIV).

Study Selection

The available review records did not provide sufficient documentation to independently confirm deduplication, dual-reviewer screening, reviewer agreement or reasons for full-text exclusion. A fully reproducible PRISMA-ScR flow diagram could therefore not be reconstructed.

To strengthen traceability, the evidence set was reconstructed using publications with verifiable journal, DOI or database records that were relevant to the stated scope. Seventeen publications were charted. This reconstruction supports transparent evidence mapping but does not substitute for rerunning and formally documenting the complete database search.

Data Charting and Synthesis

A standardised form captured author, year, country, design, population, sample size, HIV-care stage, intervention purpose, technology type, comparator, duration, psychosocial measures, engagement, principal findings, limitations and safety or governance features. Interventions were classified as AI-enabled, rule-based or adaptive, or digitally mediated without AI.

Study characteristics and findings were summarised descriptively and narratively by technology type, psychosocial outcome, population, geography and stage of evaluation. Publications from the same parent intervention were linked to prevent double-counting. No formal risk-of-bias assessment was undertaken; methodological limitations and evidence maturity were considered when interpreting the findings.

Ethical Considerations

The review used published literature and did not involve recruitment, intervention or access to identifiable participant data. Research ethics approval was therefore not required. Ethical conduct nevertheless required accurate citation, transparent reporting and avoidance of unsupported claims.

Results

Study Selection and Characteristics

The reconstructed evidence set comprised 17 verified publications from 2017 to 2025, representing 16 parent intervention programmes. Two PositiveLinks publications examined different

psychosocial outcomes from the same programme and were therefore counted as two publications but one intervention. The publications originated from the United States, China, Singapore, India, South Korea, South Africa, Canada, Peru and Nigeria.

Ten publications reported randomised or pilot randomised trials. The remaining evidence comprised mixed-methods studies, observational or feasibility studies, a content evaluation, formative qualitative work and a single-arm trial. None specifically evaluated psychosocial intervention during the immediate period following a new HIV diagnosis.

Technology Classification and Evidence Maturity

Only two publications clearly evaluated AI-enabled systems: an assessment of ChatGPT responses to antiretroviral counselling questions and a mixed-methods usability study of the MARVIN chatbot. Three publications described automated, conversational or adaptive systems without sufficient evidence that learning algorithms drove the intervention. The remaining 12 publications evaluated non-AI digital interventions, including smartphone applications, WeChat programmes, telephone counselling, interactive voice response, online social networks, SMS and mobile information links. The individual publications and their classifications are cited in chronological order in Table 1.

Most studies remained at feasibility, acceptability, pilot or early effectiveness stages. Clinical efficacy evidence was strongest for selected non-AI interventions rather than AI systems. The matrix below summarises the 17 publications and their principal psychosocial relevance.

Psychosocial Outcomes

The clearest controlled evidence for psychosocial benefit came from non-AI interventions. The mVIP app improved anxiety and depression over 12 weeks [13], Run4Love produced sustained reductions in depressive symptoms [14], and the Three Good Things plus social-network intervention reduced anxiety and negative affect [18]. The nurse-delivered mobile intervention in India improved psychological quality of life and illness perception among women with depressive symptoms [22].

Other studies reported weaker, mixed or non-causal findings. Telephone mindfulness and health coaching both improved distress over time without between-group differences [15]. The Korean Health Manager app reduced perceived stigma in a small pilot trial [20]. The Nigerian iCARE intervention was associated with fewer depressive symptoms at 48 weeks, but the absence of a comparison group prevented causal attribution [26].

The two clearly AI-enabled publications evaluated information quality or usability rather than psychosocial effectiveness [23,24]. Neither measured prevention of anxiety disorders, sustained stress reduction or outcomes among newly diagnosed people living with HIV.

Engagement, Acceptability and Implementation

Across the evidence set, recurring strengths included convenience, privacy, rapid access to information, peer connection, standardised content and potential scalability. Cultural and linguistic tailoring supported acceptability, as illustrated by the isiZulu Nolwazi_bot [21].

Recurring limitations included small or self-selected samples, single-site recruitment, short follow-up, high reliance on usability outcomes, smartphone and connectivity requirements, and limited reporting of adverse events or governance safeguards. Sustained engagement was also uncertain; in the 2025 Korean trial, only 9.5% of app participants maintained daily use during the voluntary period [27].

Strengths and Limitations of the Included Evidence

Across the included studies, recurring strengths were convenient access, privacy, rapid information delivery, standardised content, peer connection and potential scalability. Interventions that incorporated evidence-based psychological content, structured self-management or culturally and linguistically adapted communication appeared especially acceptable. The isiZulu Nolwazi_bot illustrates how local language and conversational fit may improve trust and usability [21].

The evidence was constrained by small or self-selected samples, single-site recruitment, short follow-up, heterogeneous outcomes, limited controlled evaluation and heavy reliance on feasibility, usability or engagement. Technology descriptions were often insufficient to determine whether systems genuinely used AI. Smartphone access, connectivity, data costs, digital literacy and limited reporting of adverse events, crisis pathways and governance also restricted generalisability to routine Nigerian HIV services.

Discussion

Principal Findings

The updated evidence map indicates that digital psychosocial support for people living with HIV is broader and more mature than AI-specific support. Most verified interventions used mobile applications, social networks, telephone calls, IVR or SMS. Only two clearly incorporated AI, and neither established clinical effectiveness for anxiety or stress.

The distinction between AI and digital health is therefore central. A scripted chatbot, app, video consultation or automated messaging programme may be clinically useful without using artificial intelligence. Conversely, an AI label does not establish therapeutic value, clinical validity or safety. Future studies should describe the model architecture, training or knowledge sources, version, inputs, outputs, degree of adaptation, human oversight and intended clinical function [6].

Psychological Effectiveness and the Early-Diagnosis Window

The HIV-specific evidence suggests that selected digital interventions can improve depression, anxiety, stigma, coping or self-management, but results are inconsistent and frequently derived from pilot studies. The wider mental health literature

Table 1. Reconstructed evidence matrix of 17 verified publications relevant to AI-enabled or digitally mediated psychosocial support for people living with HIV, 2017–2025

Study and setting	Design and sample	Intervention, comparator and classification	Psychosocial or engagement outcomes	Principal findings and limitations
Flickinger et al., 2017; United States (11)	Mixed-methods analysis; 55 PLWH followed for 8 months.	PositiveLinks clinic-affiliated anonymous online community; no comparator; digitally mediated, non-AI.	Social Support Behavior Code applied to posts; participant interviews; engagement patterns.	Of 840 posts, 52% provided social support. Demonstrated virtual peer support, but no experimental clinical outcome and limited generalisability.
Flickinger et al., 2018; United States (12)	Mixed-methods pilot; 77 PLWH; 12-month follow-up.	PositiveLinks community message board; no randomised comparator; digitally mediated, non-AI.	HIV-stigma scores, stress, HIV-care self-efficacy and posting behaviour.	Twenty-one per cent of posts contained stigma-related content; stigma improvement favoured active posters as a trend. Self-selection and uncontrolled comparisons limit inference.
Schnall et al., 2018; United States (13)	Randomised 12-week feasibility trial; 80 low-income PLWH.	mVIP symptom-management app versus control app; digitally mediated, non-AI.	Thirteen HIV-related symptoms, including anxiety and depression; ART adherence.	Greater improvement in anxiety, depression and several physical symptoms, with better adherence. Small feasibility trial and short follow-up.
Guo et al., 2020; China (14)	Randomised controlled trial; 300 PLWH with CES-D ≥16; follow-up to 9 months.	Three-month Run4Love WeChat CBSM and exercise programme versus usual care plus nutrition brochure; automated/adaptive, not AI.	CES-D primary; PHQ-9, PSS, WHOQOL-HIV BREF, coping, stigma and self-efficacy.	Sustained reductions in depressive symptoms and improvements in selected secondary outcomes. Requires smartphone/WeChat use and was not diagnosis-period specific.
Carey et al., 2020; United States (15)	Exploratory randomised trial; 42 PLWH; post-intervention and 3-month follow-up.	Telephone-delivered mindfulness training versus health coaching; digitally mediated, non-AI.	Anxiety, depressive symptoms, perceived stress, mindfulness, ART adherence and sexual risk.	Both groups improved over time, but no significant between-group differences. Completion was lower for mindfulness training.
Pang et al., 2020; Singapore (16)	Pilot randomised controlled trial; 40 adults living with HIV; 2 months.	Mobile Interactive Supervised Therapy app plus routine care versus routine care; digitally mediated, non-AI.	Adherence by self-report, pill count, MEMS and app records; acceptability interviews.	No significant adherence benefit, largely because baseline adherence was very high. Users perceived the app as beneficial; no psychosocial efficacy test.
Swendeman et al., 2020; India (17)	Pilot randomised controlled trial; 362 ART patients; 6 months.	Twice-daily IVR reminders and self-management messages plus weekly assessment versus weekly IVR assessment; rule-based automated system.	ART adherence, CD4 count, coping, social support, depression and other quality-of-life indicators.	Limited evidence of intervention effects. Ceiling effects and clinic-level adherence improvements restricted inference.
Li et al., 2021; China (18)	Three-arm randomised controlled trial; 404 HIV-positive men who have sex with men; follow-up to 12 months.	Three Good Things plus electronic social networking; Three Good Things alone; or information control; digitally mediated, non-AI.	Probable depression, anxiety, positive and negative affect, gratitude, happiness and social support.	The combined social-network intervention reduced anxiety and negative affect, but did not significantly reduce probable depression. Population-specific evidence.
Han et al., 2021; China (19)	Parallel randomised controlled trial; 61 PLWH; 4 weekly sessions.	Symptom-management app plus group sessions versus app access and routine follow-up; digitally mediated, non-AI.	Knowledge, self-management certainty, symptom severity/distress, adherence, social support and quality of life.	Knowledge and certainty improved; other outcomes were not significantly different. Small, single-centre and short-term trial.
Study and setting	Design and sample	Intervention, comparator and classification	Psychosocial or engagement outcomes	Principal findings and limitations
Shim et al., 2022; South Korea (20)	Pilot randomised controlled trial; 33 PLWH; 4 weeks.	Health Manager app versus PDF self-management education; digitally mediated, non-AI.	Self-efficacy, self-management behaviours, adherence, perceived health, depression and stigma.	Self-efficacy and behaviours improved and perceived stigma decreased. Sample size and short follow-up limit generalisability.
Ntinga et al., 2022; South Africa (21)	Cross-sectional feasibility study; 120 adult HIV self-test users.	IsiZulu Nolwazi bot conversational agent supporting self-testing; rule-based/AI status not demonstrated.	Acceptability, usability, conversational experience and testing support.	High satisfaction and conversational realism. Participants were testing users rather than confirmed PLWH, and no anxiety or stress outcome was evaluated.
Satyanarayana et al., 2024; India (22)	Pilot randomised controlled trial; 120 women living with HIV and psychosocial vulnerabilities; 24 weeks.	Nurse-delivered mobile phone counselling plus treatment as usual versus treatment as usual; digitally mediated, non-AI.	CES-D, ART adherence, psychological quality of life, illness perception and HIV RNA.	Among participants with depressive symptoms, adherence, psychological quality of life and illness perception improved. HIV RNA did not differ; subgroup and pilot evidence.
Koh et al., 2024; Singapore (23)	Guideline-based content evaluation; no patient sample.	ChatGPT responses to common antiretroviral therapy questions; AI-enabled.	Accuracy, completeness, clinical appropriateness and advice to seek professional care.	Responses were generally appropriate, but some lacked geographical or patient-specific detail. No psychosocial, safety or clinical outcome was tested.
Ma et al., 2025; Canada (24)	Mixed-methods usability study; 28 surveyed and 9 interviewed after 3 weeks.	MARVIN AI chatbot providing expert-validated HIV self-management information; AI-enabled.	Feasibility, usability, acceptability, perceived usefulness, ease of use and behavioural intention.	Usability exceeded the prespecified threshold and acceptability approached target. Limited comprehension and platform concerns remained; no anxiety/stress efficacy test.
Rupani et al., 2025; Peru (25)	Formative qualitative study; 28 adolescents living with HIV, 5 caregivers and 5 HIV-care personnel.	Proposed chatbot for depression education, self-help and linkage to care; rule-based/AI status unclear.	Seven acceptability constructs, including ethics, burden, coherence, opportunity cost and perceived effectiveness.	The chatbot was viewed as accessible and non-threatening. Concerns included empathy, privacy and data security. No deployed intervention or clinical efficacy evaluation.
Ogunmola et al., 2025; Nigeria (26)	Single-arm trial; 40 youth living with HIV; 48 weeks.	Daily two-way SMS medication reminders plus peer navigation; digitally mediated, non-AI.	Depressive symptoms and substance use assessed at baseline, 24 and 48 weeks with standardised measures.	Depressive symptoms were lower at 48 weeks but not 24 weeks; substance-use changes were non-significant. Small sample, low baseline symptoms and no control group.
Kim et al., 2025; South Korea (27)	Two-arm randomised clinical trial; 83 PLWH; 4-week intervention plus 4-week voluntary use.	Self-monitoring mobile app versus mobile information links; digitally mediated, non-AI.	HIV self-efficacy domains, including depression/mood, symptoms, fatigue and support; app engagement.	Both groups improved total self-efficacy; effects on depression/mood were mixed. Only 9.5% of app users maintained daily use during the voluntary period.

Note: PLWH, people living with HIV; ART, antiretroviral therapy; CBSM, cognitive-behavioural stress management; CES-D, centre for Epidemiologic Studies Depression Scale; PHQ-9, Patient Health Questionnaire-9; PSS, Perceived Stress Scale; IVR, interactive voice response; MEMS, Medication Event Monitoring System. The table contains 17 publications but 16 parent intervention programmes because the two PositiveLinks publications report different outcomes from the same programme.

provides cautious support for short-course AI conversational interventions, with modest improvements in depression, anxiety or distress in some studies [28,29]. These findings cannot be assumed to apply to HIV-related distress, newly diagnosed populations or Nigerian services.

A prevention claim also requires precision. An intervention may reduce symptoms, improve coping or facilitate referral without preventing a diagnosable anxiety disorder. Studies should distinguish universal psychoeducation, indicated early intervention for elevated distress and treatment for established disorders. Validated outcomes and prespecified thresholds are required.

None of the 17 publications specifically evaluated the immediate period following a new HIV diagnosis. Preventing anxiety disorders during this window should therefore be framed as a future clinical and research priority, not as an established review finding. A defensible pathway would distinguish universal diagnosis-period psychoeducation, indicated early intervention for elevated distress, and treatment or specialist referral for established mental disorders.

HIV-related stress may involve disclosure, stigma, treatment concerns, interpersonal violence, substance use, medical comorbidity and suicide risk. HIV-related stigma is associated with depression, anxiety, reduced social support and suicidal ideation [30]. General-purpose or unsupervised systems may fail to recognise these complexities or provide an adequate response to acute risk.

Implications for Nigeria

Nigeria now has preliminary evidence from the iCARE programme, which combined two-way SMS medication reminders with peer navigation among youth living with HIV [26]. The study demonstrates local feasibility and possible psychosocial benefit, but it was not AI-enabled and its single-arm design does not establish effectiveness. It should be treated as a platform for controlled evaluation and service integration rather than proof that AI-based psychosocial care is effective in Nigeria.

A Nigerian intervention should be culturally and linguistically co-designed with people living with HIV, counsellors, peer navigators, clinicians, community organisations and data-governance experts. Adaptation should address communication style, health literacy, stigma, faith and family contexts, gender and sexual diversity, disability and regional variation. Major Nigerian languages may be prioritised initially, but design should not assume that Hausa, Igbo and Yoruba alone represent the country's linguistic needs. Systems should function with low bandwidth, minimise data use, allow asynchronous access and provide alternatives for people without smartphones.

The safest initial model would be a clinician-supervised stepped-care tool embedded within existing HIV services. It could provide diagnosis-period psychoeducation, normalise common reactions, teach brief coping skills, assess distress with validated measures, support appointment preparation and facilitate referral. High-risk

responses—such as suicidality, severe agitation, psychosis, intimate-partner violence, inability to care for oneself or urgent medical symptoms—should trigger transparent escalation to a human service. The tool should augment, not replace, psychological first aid, adherence counselling, peer support or specialist mental health care.

Ethics, Privacy and Governance

WHO guidance emphasises autonomy, safety, transparency, accountability, inclusiveness and sustainability in AI for health [31]. Its guidance on large multimodal models also highlights risks of inaccurate, biased or incomplete outputs, cybersecurity threats and automation bias [32]. The UNESCO Recommendation requires human-rights protection, fairness, cultural diversity and human oversight [33].

In Nigeria, processing HIV status, mental health symptoms, sexual behaviour, medication information or conversational content must comply with the Nigeria Data Protection Act 2023 [34]. Implementation should use data minimisation, understandable consent, role-based access, encryption, retention limits, breach-response procedures and independent security review. Users should know whether conversations are stored, reviewed by humans, used to improve models, transferred across borders or shared with third parties.

Algorithmic evaluation should examine performance across Nigerian languages, accents, literacy levels, age groups, sexes, gender identities, socioeconomic groups and regions. Bias testing, adversarial safety testing, post-deployment monitoring, adverse-event reporting and accessible complaint mechanisms should precede scale-up.

Research Priorities

1. Rerun and document a reproducible database search with complete deduplication records, independent screening, a PRISMA-ScR flow diagram and a prespecified operational definition of artificial intelligence.
2. Conduct qualitative co-design with newly diagnosed people living with HIV, including people at heightened risk of stigma, language exclusion, disability, poverty, gender-based violence or limited digital access.
3. Develop a low-data, clinician-supervised intervention linked to existing HIV clinics, adherence counsellors, peer navigators and mental health referral pathways.
4. Evaluate feasibility, acceptability, safety, linguistic performance, digital inclusion and implementation barriers before testing clinical efficacy.
5. Use validated measures of anxiety, perceived stress, depression, stigma, coping, quality of life, treatment engagement, suicidality and adverse events, with prespecified thresholds and escalation rules.
6. Progress to adequately powered randomised or pragmatic trials with active comparators, longer follow-up, implementation outcomes and health-economic evaluation.

7. Report system architecture, knowledge sources, model version and updates, human oversight, data flows, crisis rules, failures and adverse events using reproducible AI reporting standards.

Policy and Practice Recommendations

1. Integrate pilots into existing national and subnational HIV-care pathways rather than developing isolated applications. Implementation should involve relevant health authorities, HIV programmes, professional bodies and community organisations.
2. Build digital and AI literacy among HIV counsellors, peer navigators, mental health professionals and service managers, with clear responsibility for clinical oversight and escalation.
3. Prioritise equitable mobile access through low-data design, asynchronous functions and non-smartphone alternatives, while monitoring who is excluded by language, disability, cost, geography or digital literacy.
4. Use transparent procurement and governance requirements covering data minimisation, informed consent, model documentation, cybersecurity, human review, incident reporting and compliance with Nigerian data-protection law [31–34].
5. Establish monitoring and evaluation frameworks that assess clinical outcomes, acceptability, equity, engagement, cost, implementation fidelity, unintended effects and user complaints before scale-up.

Strengths and Limitations of the Review

This review has several strengths. It preserves a focus on the critical diagnosis period while using a traceable 17-publication evidence set, distinguishing genuine AI applications from rule-based and non-AI digital interventions, linking publications from the same parent programme and retaining detailed study-level data in the evidence matrix.

Its limitations are important. The database search could not be fully rerun or independently audited from the available records, and a definitive PRISMA-ScR flow diagram could not be reproduced. No formal risk-of-bias assessment was undertaken. The review was limited to English-language publications, included heterogeneous interventions and outcomes, and sometimes drew on closely related HIV-service populations rather than newly diagnosed people living with HIV. The rapidly changing nature of AI may also reduce the currency of technology classifications. These limitations preclude pooled effect estimates and require cautious interpretation.

Conclusion

AI-enabled and digitally mediated interventions may improve access to information, peer connection, coping support and self-management within HIV care. However, direct evidence that AI prevents anxiety disorders or meaningfully reduces stress among newly diagnosed people living with HIV remains very limited. Most demonstrated psychosocial benefits came from non-AI digital interventions, while the two clearly AI-enabled

studies assessed information quality or usability rather than clinical effectiveness. Nigeria should pursue a staged, evidence-led approach centred on co-design, human oversight, cultural and linguistic fit, low-data access, validated psychological outcomes, transparent crisis escalation and strong data governance. AI should augment integrated HIV and mental health services rather than substitute for trained counsellors, peer supporters or mental health professionals.

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