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Bridging the gap: identifying barriers and strategies for widespread implementation of long-acting injectable antiretroviral therapy in Sub-Saharan Africa: a scoping review

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Abstract

Background Long-acting injectable antiretroviral therapy (LAI ART) is a new, and innovative approach to HIV treatment, designed to address several challenges, including the adherence issues associated with daily oral ART. This review synthesizes existing literature on the barriers and strategies for implementing LAI ART in the sub-Saharan Africa region, while identifying key knowledge gaps and research priorities.

Methods We performed a comprehensive literature search, encompassing electronic databases and grey literature sources. Our review included 18 studies published between 2014 and 2023, focusing on the acceptability, feasibility, effectiveness, and cost-effectiveness of LAI ART in SSA. A narrative synthesis approach was employed for reporting review findings.

Results Our review revealed a high demand and acceptability of LAI ART among people living with HIV in SSA, particularly those facing stigma and discrimination. LAI ART can improve adherence, retention, and viral suppression while reducing pill burden and frequent clinic visits. Implementation challenges include lack of regulatory approval, high cost, limited supply chain, health system capacity, trained staff, and cold storage facilities. Further research on safety and efficacy, as well as efforts in advocacy, policy, and community engagement, are needed to ensure accessibility and equity.

Conclusion This review highlights key knowledge gaps and research priorities essential for the successful implementation of LAI ART in sub-Saharan Africa. Addressing these gaps such as evaluating long-term outcomes, understanding drug resistance, and exploring the impact on sexual and reproductive health will be critical to ensuring the broader accessibility, effectiveness, and sustainability of LAI ART in the region. Further research on

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the experiences and preferences of different subgroups, as well as the interaction with other medications and co-infections, is also needed to inform tailored implementation strategies.

Clinical trials number Not applicable.

Keywords Long-acting injectable antiretroviral therapy (LAI ART), People living with HIV (PLWH), Challenges, Knowledge gaps, Research priorities, sub-Saharan Africa (SSA)

Introduction

Over four decades have passed since the initial documented case of HIV [1]. In 2022, approximately 39 million individuals were reported to be living with HIV, and 1.3 million new cases of HIV/AIDS were reported globally [2]. In Sub-Saharan Africa (SSA), HIV/AIDS remains a significant public health challenge, disproportionately affecting millions of individuals. Since the late 1980s, antiretroviral therapy (ART) has revolutionized the treatment of HIV, significantly improving patient outcomes [3]. Today's ART regimens are highly effective, well-tolerated, and safe, typically comprising a single multi-drug tablet taken once daily [4]. As of 2022, an estimated 29.8 million individuals worldwide were receiving ART [2].

Despite the remarkable success of ART, significant barriers to achieving optimal viral suppression and long-term treatment success remain [5]. Long-acting injectable (LAI) ART, holds the potential to address many of the challenges associated with daily oral medication adherence [6]. Several injectable agents are in different stages of development, including cabotegravir, rilpivirine, lenacapavir, islatravir, albuvirtide, and ibalizumab [1] In 2021, cabotegravir/rilpivirine (CAB/RPV), the first long-acting injectable ART regimen, was approved for the sustained treatment of HIV-1 in people living with HIV (PLWH) [7]. LAI ART offers a potential alternative to daily oral regimens, with the added advantage of extended dosing intervals. While daily oral ART is effective, challenges such as stigma, forgetfulness, complex dosing schedules, and drug-drug interactions can undermine adherence, compromising viral suppression and overall health [5]. This review aims to critically examine the current evidence on LAI ART in SSA, drawing insights from research studies, policy documents, and stakeholder perspectives.

A study conducted in the United States and Spain among PLWH revealed a preference for LAI ART regimens over daily oral ART [8]. In the same study, healthcare professionals expressed concerns about resistance and the complex clinical supervision associated with LAI ART medication over oral ART [8]. In a clinical trial comparing LAI ART to daily oral ART, participants in the LAI ART group reported significantly higher levels of satisfaction with their therapy compared to those receiving oral ART [4]. Despite these promising findings, studies conducted in high-income countries (HIC) have identified several barriers to the uptake of LAI ART, including drug-related issues (such as oral lead-in, high-volume gluteal injections, injection site reactions, and drug interactions), patient-related factors (such as limited safety data, frequent clinic visits, access challenges, and issues related to gluteal tissue), and system-related barriers (such as increased clinic volume, the need for provider training, drug costs, staffing, space requirements, and cold chain logistics) [3]. Addressing these challenges is crucial for successful LAI-ART delivery and uptake.

In Uganda, a clinical trial showed that 94% of participants favored continuing LAI-ART citing benefits such as improved adherence, privacy, viral suppression, and reduced stigma. However, systemic barriers such as cost, cold chain requirements, and logistical challenges remain significant hurdles to scaling up LAI ART in the region [9]. LAI-PrEP is another promising HIV prevention strategy. However, awareness among people who use drugs (PWUD), a key population in the HIV response, remains low (25.6%) compared to 67.1% awareness for oral PrEP. However, 73.5% showed willingness to use it among this population [10]. Another study in China also highlights LAI-PrEP's potential to expand coverage but underscores the need for targeted interventions to address adherence challenges and prioritize sexual health discussions during PrEP initiation [11, 12]. This scoping review aims to assess the landscape surrounding LAI ART and PrEP in SSA, focusing on the challenges and opportunities that may facilitate its large-scale implementation.

Methodology

Study design, information sources and literature search

This scoping review followed guidelines for authors for the systematic scoping review [13]. We searched PubMed, Google Scholar, Web of science and EMBASE databases. The main search terms included "People Living with HIV"AND "Sub-Saharan Africa", AND Long-Acting InjectableAntiretroviral" AND "Challenges and Opportunities". All database searches were for sources from 01 January 2014 to 31 December 2023. The reference lists of all full-text screening articles were also searched for relevant studies. To ensure the consistency and quality of the findings, two independent authors (PG and PGI) searched for the articles and the research team screened and synchronized the extracted data.

Research questions

This scoping review sought to answer the following questions:

(i) How acceptable and feasible is LAI ART implementation in SSA?
(ii) What are the challenges of LAI ART implementation in SSA?
(iii) What are the possible solutions to LAI ART implementation challenges in SSA?
(iv) What are the potential benefits of LAI ART implementation in SSA?

Study selection and inclusion criteria

In this review, we included studies conducted in SSA from 2014 to 2023 and reported the use of LAI ART and the associated challenges. The selected studies focused on the challenges and opportunities of scaling up LAI ART in SSA, provided an overview of the current state of LAI ART implementation in SSA, barriers, and facilitators to its expansion, and discussed the outcomes/results for clinical trials conducted on LAI ART. Studies that included primary data on perceived challenges and acceptability, feasibility, and cost-effectiveness of LAI ART, commentary, review, and perspectives papers were included. Papers reporting the same findings outside of Africa were not included in the review.

Screening and data abstraction process

Our screening procedure followed Arksey and O'Malley's framework [14] with title, abstract, and full-text screening stages. Initially, three independent reviewers screened all titles to assess their relevance. Studies that met the initial inclusion criteria based on title were retained for further review. The next step involved reviewing the abstracts of potentially relevant articles, where the research team evaluated eligibility based on the content provided in the abstract. Finally, articles that passed the abstract screening underwent full-text screening, where the eligibility was re-assessed by reviewing the entire article to ensure it met the inclusion criteria. In addition to database searches, hand-searching of eligible full-text articles was conducted to identify any additional relevant studies. After identifying the final set of studies, data abstraction was performed. A data abstraction form was used to capture key information, including article title, first author, year of publication, study countries and target populations, study design, key findings related to the use of LAI ART (such as accessibility and usability, perspectives of end users, cost-effectiveness, and recommendations for program implementation).

Data synthesis

Both quantitative and qualitative outcomes were collected and tabulated for each study. Thereafter, collating, summarizing, and reporting the findings were done. The findings of the study were reported in a narrative synthesis.

Results

The initial search retrieved 513 and 7 articles from hand searching, and 50 articles were eligible for abstract screening. A total of 30 articles were included after abstract screening, while 12 articles were excluded at this stage. 30 articles underwent full-text screening (supplementary file 1 of articles eligible for full-text screening). Twelve studies were excluded at this stage as they were conducted outside of Africa. A total of 18 articles were included in the final review. Notably, a study by Castor et al. (2020) [15] was included in the review because study areas were not specified, and studies by Mantsios et al. (2022) [16] and Deanna Kerrigan et al. (2020) [17] were included in the final review because the studies were multi-country. Screening details are presented in Fig. 1 below, which is typically used to report items for a systematic review (PRISMA).

Characteristics of included studies

The literature search yielded a variety of studies: four qualitative studies, one quantitative study, five review studies, three cross sectional studies, two mixed-methods studies, one modelled economic evaluation and threshold analysis, one commentary, and one mathematical modeling study. The studies covered different countries and populations in SSA including Tanzania, South Africa, Uganda, Kenya, Nigeria and Guinea-Bissau. Details of study characteristics are summarized in Table 1. This review encompasses a diverse array of populations affected by or at risk of HIV infection in various regions. Included groups are female sex workers living with HIV in Tanzania and the Dominican Republic [17], HIV-negative sexually active heterosexual men in Johannesburg [18], infants, children, and adolescents at risk of HIV [19], as well as a broad spectrum of individuals such as adolescents, young adults [20], and key populations in different contexts. The study also considers pregnant and postpartum women in oral PrEP studies, individuals with virological failure on first-line antiretroviral therapy, and a general category of people living with HIV [1]. The studies also have different intervention and outcome characteristics, and sometimes conflicting findings on the challenges and opportunities of LAI ART implementation in SSA.

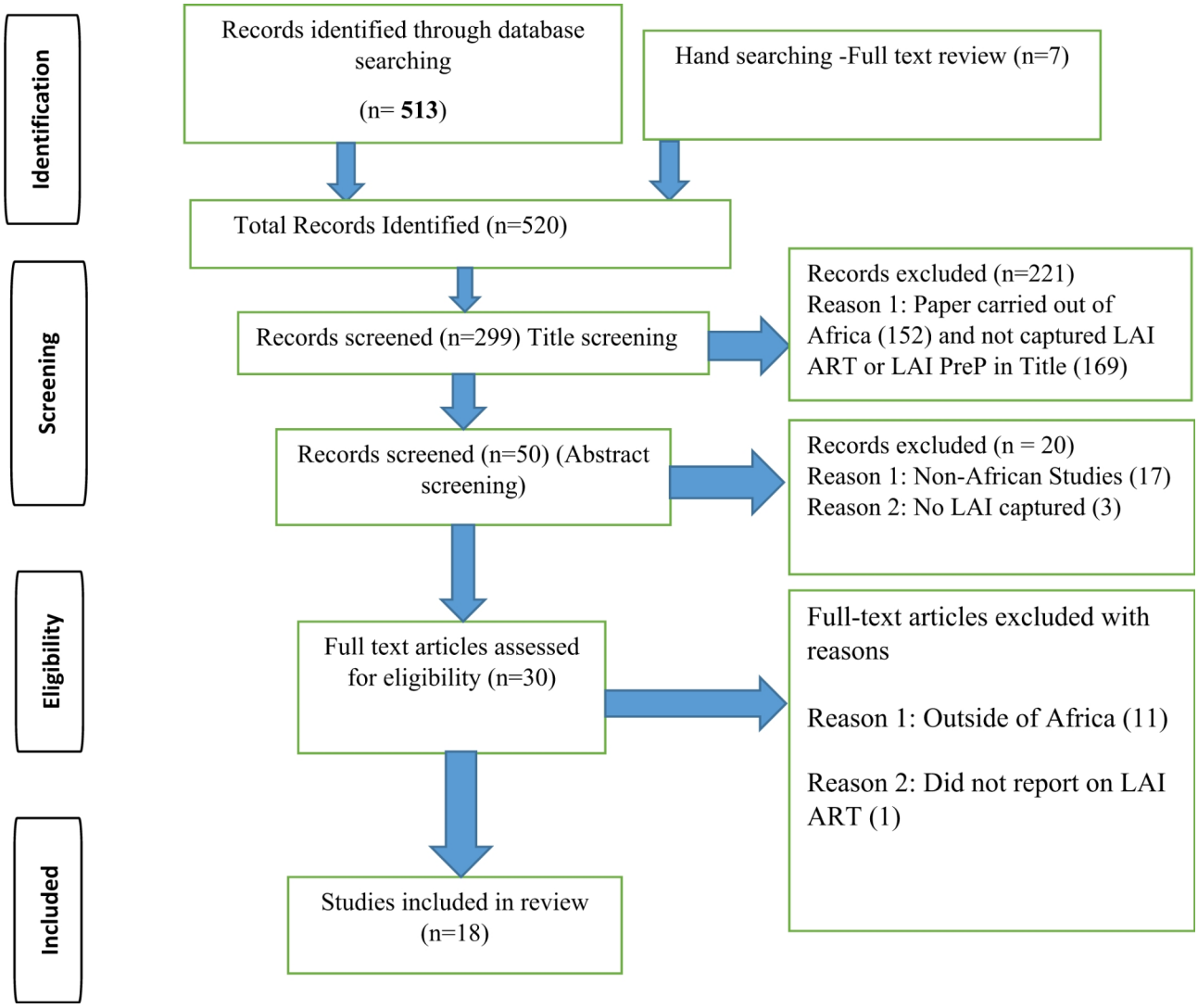

Fig. 1 Details of screening procedure

Study findings

Acceptability and feasibility of LAI ART

The acceptability of LAI ART in SSA is influenced by various factors at the individual, population, and health system levels. A study conducted in Kenya [24] have explored the demand, preferences, and experiences of different groups of PLWH regarding LAI ART. The findings showed that LAI ART has a high potential acceptability among PLWH, especially those facing stigma, discrimination, or violence due to their HIV status or other factors. For example, a study in South Africa found that LAI PrEP had a high acceptability rate of 48%, compared to 33% for oral PrEP and 20% for condoms among heterosexual men in urban settings, who valued its convenience and discretion [18]. Similarly, another study done in Nigeria revealed 88% of HIV-negative sexual minority men (SMM) were willing to use LAI PrEP, with 44% preferring it over other modalities [31]. Another study in Kenya reported positive initial reactions to LAI ART among women and adolescents, who appreciated its potential to improve their health outcomes and quality of life [24]. A study in Tanzania revealed 92.27% of high demand and acceptability for LAI ART among female sex workers (FSW), influenced by various factors such as quality of HIV care, clinic access, income, and years on ART [17]. In contrast, another study in South Africa found 12% preference for LAI ART over oral ART among a general sample of PLWH, influenced by factors such as medication stock-outs, side-effects, pill-burden, treatment changes, and HIV stigma [23].

Challenges revealed from included studies

Several studies in Africa explored the use of LAI ART for HIV prevention and treatment, and the findings underscored the potentials of the program to improve the lives of people living with or at risk of HIV. However, they also

Table 1 Characteristic of study included in review

SN	Authors	Year	country involved	Study Design	Target population	Sample size and Reference
1.	Deanna Kerrigan et al.	2020	Tanzania and Dominican Republic	Mixed methods	Female sexual workers Living with HIV	208 in Tanzania and 201 in Dominican Republic [17].
2.	Chih-Yuan Cheng et al.	2019	South Africa	Cross sectional study	Self-reported HIV-negative heterosexual men	178 [18].
3.	Elaine J Abrams et al.	2020	Global review paper no country specified	perspective paper	children, adolescents and Pediatric age groups requiring alternatives to daily oral antiretroviral therapy (ART).	Not applicable [19]
4.	Jamieson et al.	2022	South Africa	Modelled economic evaluation and threshold analysis	Heterosexual adolescents and young adults aged 15–24 years, Female sex workers (FSWs) and Men who have sex with men (MSM).	This model-based study used data from the HPTN 083 and HPTN 084 trials population-level data [20].
5.	Jespersen et al.	2020	Guinea-Bissau	descriptive review	HIV-infected individuals in Guinea-Bissau	Not Applicable [21].
6.	Castor et al.	2019	Global review paper	Review paper	Individuals living with or at risk of HIV infection and Policymakers, healthcare providers, and program implementers involved in HIV prevention and treatment initiatives	Not Applicable [15].
7.	MacCarthy et al.	2018	Uganda	Qualitative study	Adolescents aged 14–17 and young adults aged 18–24 living with HIV in Kampala, Uganda.	Focus group: 7 (1 with Community Advisory Board members, 2 with healthcare providers, and 4 with adolescents and youth [22].
8.	Toska et al.	2023	South Africa	cross-sectional study	Adolescents and young people living with HIV (AYLHIV) in South Africa, particularly those struggling with adherence to ART and facing challenges such as pill burden, stigma, and treatment side effects.	953 Adolescents and young people living with HIV (AYLHIV) [23].
9.	Simoni et al.	2021	Kenya	Qualitative study	49 PLWH including 8 male and 8 female youth (under 25), 7 adult men and 7 adult women (25 or older), 11 men who have sex with men (MSM), and 8 female sex workers.	6 focus group [24].
10.	Mgodi et al.	2023	SSA	Narrative review	Adolescent girls and young women (AGYW) in SSA and Other key populations at significant risk of HIV acquisition who face barriers to preventive services.	Not applicable [25].
11.	Moyo	2022	SSA	Narrative review	People in sub-Saharan Africa at risk of HIV-1 infection, particularly those struggling to adhere to oral PrEP.	Not Applicable [26].
12.	Wara et al.	2022	South Africa and Kenya	Cross sectional study	Pregnant and postpartum women in South Africa and Kenya who had prior experience with oral PrEP.	190 women in South Africa and 204 women in Kenya [27].
13.	Berruti et al.	2021	Multicountry review	Comprehensive review	Not Applicable	Not applicable [1].
14.		2020	Kenya	mathematical modeling study	Adolescents and young adults (age 10–24) living with HIV in sub-Saharan Africa, specifically in Kenya.	The model assumes a population-level projection with 85% of AYA switching from oral to injectable ART [28].
15.	Reynolds Z, McCluskey SM, Moosa MY, et al.	2020	Uganda and South Africa	Cohort study	Adults in HIV care who are experiencing virological failure on first-line ART.	A total of 840 participants were enrolled in the study [29].
16.	Grimsrud A, et al.	2023	Sub-Saharan Africa and other high-burden regions.	Commentary Articles	PLHW who are on treatment, Individuals at high risk of HIV acquisition, particularly those needing or considering pre-exposure prophylaxis (PrEP) and Health systems and providers implementing (DSD).	Not Applicable [30].

Table 1 (continued)

SN	Authors	Year	country involved	Study Design	Target population	Sample size and Reference
17.	Ogunbajo et al.	2022	Nigeria	Cross sectional study	HIV-negative sexual minority men (SMM)	305 sexual minority men (SMM) who self-identified as HIV-negative or were unaware of their HIV status [31].
18.	Mantsios et al.	2022	Tanzania and Dominican Republic	Qualitative study	Female sexual workers	40 [16].

faced various challenges that could limit their effectiveness and accessibility. One study in South Africa reported that LAI ART was more costly than oral ART, and could cause drug resistance and side effects [20]. A review study revealed potential challenges LAI ART might face during implementation, such as the lack of regulatory approval, the high cost, the limited supply chain, and the need for cold storage and trained staff [1]. A study in SSA reported that long-acting extended-duration (LAED) formulations, such as implants, injectables, and vaginal rings, faced the challenges of shortage of healthcare providers, inadequate infrastructure, patient concerns, cost, and drug resistance [25]. A fourth study among PLWH in low- and middle-income countries (LMICs) reported that long-acting HIV treatment and prevention such as injectable antiretrovirals and broadly neutralizing antibodies, faced the challenges of acceptability, demand, supply, delivery, monitoring, and cost-effectiveness. Other findings revealed that the health system and client challenges that CAB-LA faces in Africa, such as cost, refrigeration, training, knowledge, accessibility, side effects, stigma, and support [29]. In Kenya, potential side effects were a particular concern among women and most participants preferred clinic-based administration over self-injections at home due to concerns about safety, privacy, and potential need for refrigeration [24]. These data showed that LAI ART had the potential to transform the lives of millions of people affected by HIV in Africa, but also that there were many challenges and opportunities that needed to be considered and addressed.

Proposed solution to identified challenges

The findings from the studies conducted in Tanzania and the Dominican Republic, suggested that FSW, who are among the most vulnerable groups to HIV, could benefit from LAI ART if they receive community-driven approaches that include tailored health education, improved patient-provider communication and quality of care, and strategies to facilitate appointment adherence [17]. These approaches could help FSW overcome the barriers of stigma, discrimination, violence, and lack of access that often prevent them from using oral ART.

The study also estimated that the cost per CAB-LA injection would need to be between $9.03 and $14.47 for it to be similarly or more cost-effective than daily oral tenofovir disoproxil fumarate and emtricitabine (TDF/FTC), and hence acceptable to the South African government [20].

In SSA, a study evaluated the feasibility and acceptability of long-acting HIV treatment and prevention (LAHTP), such as injectable antiretrovirals and broadly neutralizing antibodies, and highlighted the need for decision-makers to define and gather relevant data to inform their investment case within the existing health

systems context. The findigs underlined the importance of engaging with key stakeholders, including PLWH, providers, regulators, and funders, to ensure that LAHTP meets the needs and preferences of the end-users and is aligned with the national and global HIV goals [15].

In Uganda, a study examined the factors influencing ART adherence among youth living with HIV, and revealed that programs and policies to improve ART adherence should address the specific challenges faced by this age group, such as economic independence, school support, family and peer engagement, and medication simplification [22]. These factors could affect the willingness and ability of youth to use LAI ART, which could offer them more convenience and privacy than oral ART.

One study proposed that the region should develop laboratory capabilities, enhance research, train and retain more healthcare providers, invest in infrastructure, integrate services, advocate for patent waivers, and procure drugs collectively, in order to improve the availability and affordability of LA-ART [23]. The study also suggested that advocating for waiving of CAB-LA patent licence, conducting demonstration projects in Africa, promoting the use of renewable energy sources, healthcare provider training, task shifting, community engagement, client education, and implementing adherence promotion strategies, could facilitate the uptake and effectiveness of LA ART [25]. Another study highlighted the differences between HIV treatment and prevention programs, and the need to consider the building blocks of differentiated service delivery (DSD): who (provider), where (location), when (frequency) and what (package of services) [30]. In addition, these findings suggested that LAED regimens should utilize DSD models emphasizing community level acesss and self-management, addressing the specific barriers and needs of the affected populations [30].

Potential benefits associated with LAI-ART

A multi-country study highlighted the potential benefits of long-acting products for improving adherence, reducing stigma, and enhancing quality of life for infants, children, and adolescents affected by HIV [19]. Another study on PLWH and individuals at risk for HIV infection reviewed the advantages of injectable antiretrovirals, such as longer duration of action, more stable drug levels, less frequent administration, and improved adherence and retention. Another study on feasibility and acceptability of long-acting injectable cabotegravir (CAB-LA) for HIV-1 prevention, and found this new treatment program promising for reducing the risk of HIV transmission [26]. A study in Kenya estimated the cost-effectiveness and impact of LAI ART on HIV incidence and mortality among adolescents and young adults over 10 years, compared to oral ART. The findings showed that LAI ART could prevent more new HIV infections and deaths than oral ART, and that the cost threshold for LAI ART to be cost-effective was lower when non-adherent oral ART users were assumed to be less likely to switch to LAI ART [28]. A study in South Africa compared the benefits and issues of long-acting extended-duration (LAED) regimens for HIV treatment and prevention and suggested that LAED regimens offer unique benefits for expanding uptake, effective use and adherence.

Discussion

Our review underscores the benefits of LAI ART program but also highlight the key considerations before implementing this initiative in SSA. The findings of various studies showed that LAI ART can improve adherence, retention, and viral suppression compared to oral ART, and reduce the pill burden and the frequency of clinic visits. Adherence to HIV treatment was the main topic over the last three decades. The studies conducted in different regions of the globe reported adherence rate ranging from 50 to 90% depending on the measurement methods and the settings [32]. Consistently, the findings from SSA underlined the the convenience and preference of LAI ART over oral ART, stigma reduction of stigma as well as discrimination associated with LAI ART. The improved quality of life and satisfaction associated with LAI ART was also pointed out [33, 34]. The target study population also led to the discrepancies in the findings, as some studies focused on specific subgroups of PLWH, such as men who have sex with men, transgender women, or people who inject drugs, who may face different barriers and facilitators to adherence [35–37].

This review revealed potential challenges LAI ART might face during implementation, such as the lack of regulatory approval, the high cost, the limited supply chain, and the need for cold storage and trained staff. Similary, these findings were reported in the study by Jolayemi et al. (2022), which explored the perspectives of consumers, clinical and non-clinical stakeholders on LAI ART in Los Angeles County, California [38]. They found that regulatory approval remains an issue before rolling out this lifetime treatment, as the first LAI ART product was approved by the U.S. Food and Drug Administration (USFDA) in January 2021 and others are in the treatment (and prevention) pipeline [39]. Cost effectiveness and challenges in supplying LAI ART was reported by other scholars [40]. Reza et al. (2013), who developed a three-step approach to evaluate and prioritize the cost-effectiveness criteria in supply chain management using fuzzy multiple attribute decision-making [41]. The study suggested that LAI ART could reduce the total cost of HIV treatment by improving adherence and reducing the frequency of clinic visits. However, it also highlighted the need for adequate information, education,

and counseling, as well as supportive relationships and follow-up visits [42].

This review highlighted that there is inadequate health system capacity, and uncertainty about the safety and efficacy of LAI ART in different populations and settings, potential drug resistance and adverse events [35, 43]. The study conducted by Margolis et al. (2015) [44], emphasized the current challenges and future directions of LAI ART program. The findings showed that infrastructure was the main issue and a need for capacity building for staff were also common challenges [43]. Another study also highlighted the importance of addressing the gaps in knowledge and evidence on the long-term outcomes and safety of LAI ART, especially in resource-limited settings and diverse populations [45]. The present review suggests the need for more evidences on the safety and efficacy of LAI ART in SSA, as well as for more advocacy, policy, and community engagement to ensure the accessibility and equity of LAI ART. Similar interventions have been also suggested as priorities in other settings, such as the USA [43]. Community engagement will also be a key to the success of implementing of LAI ART, as emphasized by the theme of the World AIDS Day 2023, "Let Communities Lead" [46]. withEmporing and mobilizing community considered as a cornerstone for achieving sustaainedned heath outcomes [47]. To ensure the successful rollout of LAT ART in SSA, feasabilities studies tailored to to this context are necessary. This review has highlighted key research priorities before implementing LAI ART program in low and middle incomes countries with high HIV AIDS burden. These include determining the optimal dosing regimens, assessing long-term outcomes, evaluating the impact on sexual and reproductive health, exploring drug interaction with other medications and co-infections, and understanding the preferences and experiences of different subgroups of PLWH. Other studies have echoed similar priorities emphasiszing the importance of pharmacodynamics and pharmacogenetics research in different population [33, 48]. Drug resistance would be also the area of interest, as the long half-life of LAI ART may increase the risk of resistant strains seclection in cases of suboptimal adherence or treatment interruption [49].

The impact of LAI ART on sexual and reproductive health is another important area of research, as LAI ART may affect hormonal contraception, pregnancy, breastfeeding, and sexually transmitted infections among PLWH [3]. Additionally, the potential interaction between LAI ART and other medications or co-infections is a significant concern, given the high prevalence of of cormobidities in PLWH. Such interactions could alter the pharmacokinetics or pharmacodynamics of LAI ART, potentially affecting its efficacy and safety [45]. Finally, understanding the preferences and experiences of different subgroups of PLWH is essential to assess the acceptability, feasibility, and satisfaction associated with LAI ART, as well as the potential barriers and facilitators to its uptake and adherence. In summary, LAI ART can provide more benefits compared to oral ART but comprehensive studies on the implementation and faisibililty of the program are warranted.

Limitations

This review has some limitations and strengths. Even though the search retrieved different studies addressing LAI ART in the region, one of the limitations is linked to our electronic search which might have missed out some articles. Another limitation of this review is associated with the articles included, which were only in English, and there is potential of missing non-English articles. Another key limitation of this review is the absence of formal quality assessment, which may have introduced selection bias and affect the overall rigor of the findings. However, we believe that this review presents important information to guide the roll out LAI ART in SSA.

Conclusion

This review focuses on the feasibility and acceptability of LAI ART in SSA, where high HIV prevalence and oral ART adherence challenges exist. The review findings posit a potential high acceptability, especially among those facing stigma. LAI ART could enhance adherence, but challenges like cost and regulatory approval need consideration. This review highlights key knowledge gaps and research priorities essential for the successful implementation of LAI ART in sub-Saharan Africa. Addressing these gaps such as evaluating long-term outcomes, understanding drug resistance, and exploring the impact on sexual and reproductive health will be critical to ensuring the broader accessibility, effectiveness, and sustainability of LAI ART in the region. Further research on the experiences and preferences of different subgroups, as well as the interaction with other medications and co-infections, is also needed to inform tailored implementation strategies.

Abbreviations

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
CAB/RPV	Cabotegravir/rilpivine
DSD	Differentiated service delivery
FSW	Female sex workers
HIV	Human immunodeficiency virus
LAED	Long-acting extended-duration
LAHTP	Long-acting HIV treatment and prevention
LAI ART	Long-acting injectable antiretroviral therapy
LMICs	low- and middle-income countries
PLWH	People living with HIV
PrEP	Pre-exposure prophylaxis
SSA	Sub-Saharan Africa
USFDA	U.S. food and drug administration

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12879-025-10871-0.

Supplementary Material 1: **Supplementary File 1**: List of paper included in Final Review

Supplementary Material 2: **Supplementary File 2**: Table Summarizing Keys findings

Supplementary Material 3: **Supplementary File 3**: PRISMA Checklist

Supplementary Material 4: **Supplementary File 4**: Search strategies

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Author contributions
PG contributed to the design of the work, analysis, interpretation of results, drafting, and revision of the manuscript. PGI, ES, MMK, FN, AI, GM, MR, ER, TM and TU contributed to the design of the work and Screening of the papers. IEM, JDH, EM, TD and CMM contributed to the design of the work, interpretation of results, and revision of the manuscript.

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Data availability
All the data we used is available in the supplementary files.

Declarations

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The authors declare no competing interests.

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