

Systematic Literature Review: The Role of the Health System in Combining HIV/AIDS: Challenges and Effective Strategies

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Abstract

Background: HIV/AIDS is a global health issue with widespread impact, affecting not only individuals infected but also society and healthcare systems. Efforts to combat HIV/AIDS require active involvement from the healthcare system in prevention, diagnosis, treatment, and psychosocial support. The main challenges in these efforts include social stigma, limited access to healthcare services, and the continuous increase in the number of cases.

Method: This study uses a literature review approach, analyzing journals and articles published between 2019 and 2024, sourced from databases such as PubMed, SageJournals, and SpringerLink. The analysis focuses on the role of the healthcare system in addressing HIV/AIDS, the challenges faced, and effective strategies to overcome these issues.

Results: The study found that the biggest challenges in HIV/AIDS management include a lack of public awareness, low early detection rates, and limited resources at healthcare facilities. Effective strategies include public education, improving access to healthcare services, and strengthening referral systems.

Conclusion: The healthcare system plays a crucial role in the fight against HIV/AIDS. Despite the significant challenges, the implementation of appropriate strategies, such as education, better access to healthcare services, and combating stigma, can improve the effectiveness of HIV/AIDS control programs.

Keywords: HIV/AIDS, healthcare system, challenges, strategies, prevention

Introduction

HIV/AIDS (Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome) remains one of the most significant global health issues, with profound social and economic impacts. Since its identification in the 1980s, HIV/AIDS has posed a severe challenge in public health worldwide (Kintu et al., 2020). Despite various efforts to combat HIV/AIDS, the disease continues to be one of the leading causes of death due to infectious diseases. Various initiatives have been implemented by governments, non-governmental organizations, and other stakeholders, but the situation remains critical (Adugna et al., 2021). The prevalence of HIV/AIDS in Indonesia has shown alarming figures. According to reports from the Indonesian Ministry of Health, the number of HIV cases has been steadily increasing, especially among the productive age group. Although preventive measures and control programs have been carried out, there are still significant challenges in slowing the spread of the virus. One of the main obstacles is the high level of social stigma attached to those living with HIV/AIDS, which prevents them from accessing the healthcare services they need. This stigma and discrimination often result in social isolation, worsening both the mental and physical health of individuals affected by the disease.

In addition to stigma, limited access to adequate healthcare services remains a major issue in the fight against HIV/AIDS. In many areas, especially in remote regions, healthcare facilities focused on HIV prevention, diagnosis, treatment, and psychosocial support are still scarce. The lack of healthcare infrastructure, trained medical personnel, and low public awareness of the importance of early detection are key barriers to effectively combating HIV/AIDS. Many individuals do not learn of their HIV status until the disease has progressed to more severe stages, which can lead to fatal outcomes (Adeyemi et al., 2021). The healthcare system plays a crucial role in efforts to combat HIV/AIDS. A well-functioning healthcare system can provide comprehensive services for individuals with HIV/AIDS, ranging from prevention to antiretroviral (ARV) treatment and psychosocial support. Effective ARV treatment can suppress the viral load in the body, prevent the progression to AIDS, and significantly improve the quality of life for patients. However, the

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availability and accessibility of these treatments remain challenges, particularly in regions far from healthcare centers. Therefore, systematic and collaborative efforts are needed to improve healthcare access across Indonesia.

In addition, strengthening HIV/AIDS prevention efforts is essential, particularly by increasing public education about the transmission and prevention of HIV. Programs that address risk factors, such as the use of unsterilized needles, unprotected sexual intercourse, and needle exchange programs for drug users, are critical in breaking the chain of HIV transmission. Prevention programs must also consider social, cultural, and economic factors that influence individuals' behaviours and their ability to access healthcare services. Furthermore, the fight against HIV/AIDS requires collaboration between the government, non-governmental organizations, and society. The government must ensure that policies and regulations support HIV/AIDS control efforts, such as improving access to ARV medications, raising awareness, and providing legal protection for people living with HIV/AIDS against discrimination (Antabe et al., 2021). Society, in turn, must be more open and supportive of individuals with HIV/AIDS in their efforts to access healthcare services and adhere to treatment. A holistic approach involving various sectors is needed to create an environment that supports people with HIV/AIDS in accessing their rights, including the right to quality healthcare and treatment. Given the many challenges faced, HIV/AIDS control strategies must adopt a multidimensional approach that not only focuses on medical aspects but also on social behaviour change and improving the quality of life for people living with HIV/AIDS (Bisht, 2019). Therefore, more integrated efforts are required to strengthen the healthcare system to achieve effective and sustainable HIV/AIDS control. A robust healthcare system, supported by the involvement of all sectors of society, is expected to reduce HIV transmission rates and provide optimal care for people living with HIV/AIDS.

Method

Study Design

This research is a systematic review aimed at exploring the role of the health system in efforts to combat HIV/AIDS, as well as the challenges and strategies implemented to address these issues. This systematic review follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, which are designed to organize and report systematic research transparently and structurally. The study examines various relevant studies published in both international and national journals, as well as related reports on the health system and HIV/AIDS control.

Table 1. PICO

P (Population)	People living with HIV/AIDS, public health services, health workers and service providers.
I (Intervention)	Treatment and prevention strategies implemented by the health system; education, treatment and care programs for HIV/AIDS sufferers; public health policies designed to reduce transmission rates
C (Comparison)	Health systems without a focused strategy, other approaches or comparisons with health systems in other countries that may use different strategies
O (Outcome)	Effectiveness of health system strategies in reducing the spread of HIV/AIDS, improving access and quality of health services for HIV/AIDS patients, eliminating challenges and obstacles faced by the health system in its efforts to fight HIV/AIDS, improving the quality of life of people living with HIV/AIDS

Data Sources and Search Strategy

The literature search was conducted using three main databases: PubMed, SageJournals, and SpringerLink were searched on November 7, 2024. To obtain relevant literature, we employed Boolean search techniques with a combination of keywords including: "Health System" AND "HIV/AIDS" AND "Challenges" AND "Strategies". The search focused on articles published within the last five years (2019-2024), considering the importance of updated data in the context of evolving health policies.

Study Selection

The study selection began by identifying relevant articles through keyword searches. Articles that met the inclusion criteria were those discussing the health system within the context of HIV/AIDS management, published between 2019 and 2024, and containing analysis of the challenges faced by the health system in HIV/AIDS management, including implemented strategies. Additionally, studies needed to demonstrate good methodological quality, such as quantitative, qualitative, or literature reviews that provided an in-depth understanding of the topic. Excluded from this review were articles that did not discuss the health system or HIV/AIDS management, studies lacking relevant data on challenges or strategies in HIV/AIDS management, and articles available only as abstracts or without full access. Once relevant articles were identified, the next step involved removing duplicate articles and screening based on abstracts and titles. Articles meeting the inclusion criteria were then thoroughly evaluated, with the authors analyzing the methodology and conclusions of each study to ensure the validity and quality of the data used in this research.

Identification of studies via databases and registers

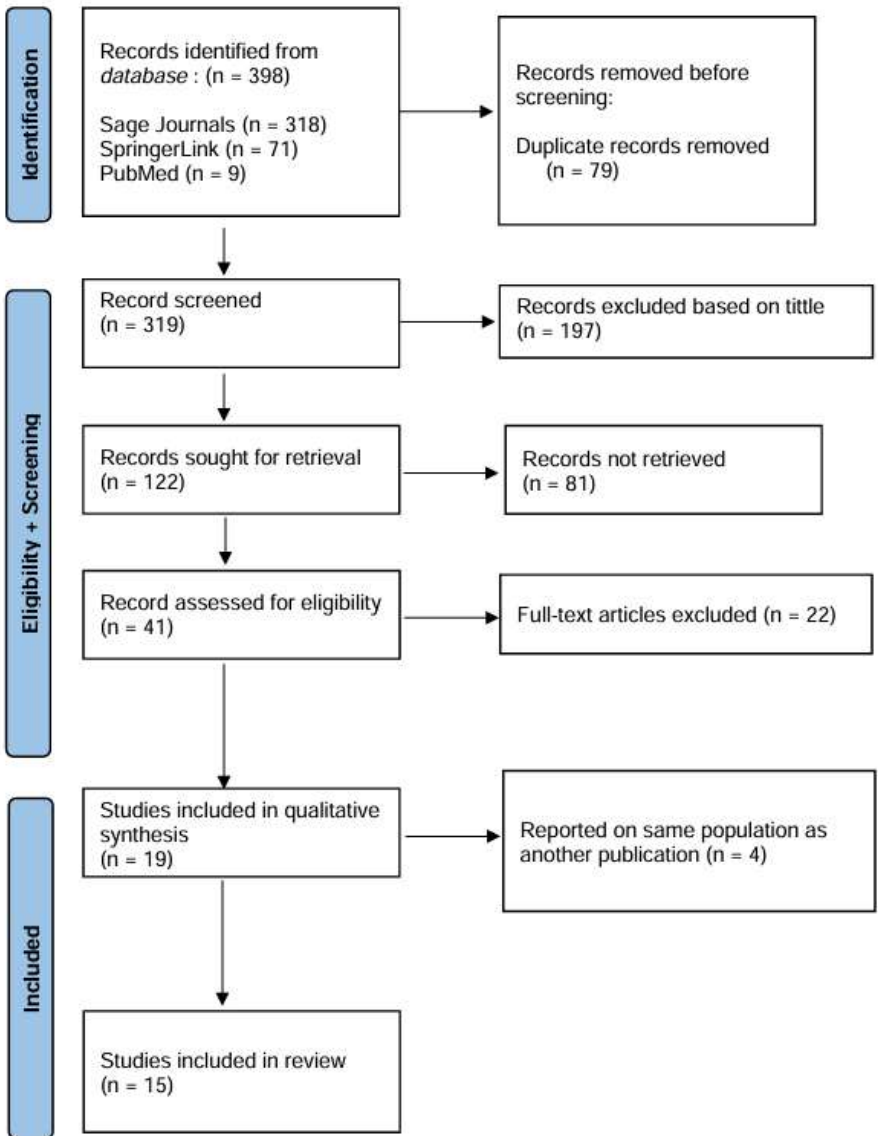


Chart 1. PRISMA Research Flow

Data Extraction

The data extraction process was conducted meticulously to ensure that the information obtained from each article was relevant and could be used to draw valid conclusions about the role of the health system in HIV/AIDS management. Additionally, data analysis included an evaluation of the successes and failures of various strategies implemented in the health system, as well as factors affecting their effectiveness, such as resource support, public policy, and community involvement in HIV/AIDS control efforts.

Table 2

Category	Inclusion Criteria	Exclusion Criteria
Topic	Studies that discuss the health system in the context of HIV/AIDS management	Studies that are not relevant to the Health system or do not address HIV/AIDS
Publication Period	Articles published between 2019 and 2024	Articles published before 2019
Research Focus	Studies with analysis of challenges in HIV/AIDS management and strategies implemented, such as early detection, health system strengthening, or prevention programs	Studies without relevant data on challenges or strategies in HIV/AIDS management
Methodology	Studies with valid methodology (quantitative, qualitative, or literature reviews that provide an in-depth understanding of the topic)	Studies with poor methodological quality or insufficient depth
Population	Research that includes PLWHA (People with HIV/AIDS) or at-risk population groups, such as pregnant women and injecting drug users	Research that is not relevant to the target population or focuses on populations unrelated to HIV/AIDS
Geographical context	Studies that are relevant to the context of health policies and services in Indonesia or other countries that discuss the HIV/AIDS health system	Studies that have no relevance to the policy context or challenges in the HIV/AIDS Health system

Results and Discussion

Overview

In the initial search, there were 398 journal articles identified from the main database. Article screening was carried out based on title, obtaining 197 articles for review. Of the 122 articles excluded from the final analysis, obtained 41 eligibilities so that the literature analysis was carried out on 15 literatures that met the criteria (figure 1).

Study Characteristic

Based on the results of this study, various approaches to HIV/AIDS management are tailored to local contexts and specific population groups. The use of pre-exposure prophylaxis (PrEP), as proposed by Claudia Estcourt et al. (2021) in Scotland, has shown effectiveness in preventing HIV in at-risk groups, although there are challenges in this regard, namely limitations, such as variations in HIV testing data and lack of detailed sexual behavior data. Other studies, such as by Wong et al. (2023), found a high proportion of HIV cases diagnosed late in Asia, indicating the need for early detection promotion strategies. Meanwhile, Miranda et al. (2023) in Brazil emphasized the importance of preventing mother-to-child transmission (MTCT). In addition, studies by Corey et al. (2022) and Thompson et al. (2024) reviewed new approaches to managing HIV-related neurological disorders. Overall, these studies emphasize the importance of prevention, early detection, health system strengthening, and policy support for successful HIV/AIDS management.

Author and Year	Country	Study Design	Title	Sample	Research Method	Result	Conclusion
Claudia Estcourt et al., 2021	Scotland	Retrospective cohort study	Population-level effectiveness of a national HIV preexposure prophylaxis programme in MSM	Men who have sex with men (MSM) in Scotland before and after the PrEP program	Compared epidemiological data on HIV during two periods: pre-PrEP (2015–2017) and during PrEP (2017–2019)	The PrEP program significantly reduced HIV incidence among high-risk MSM groups. No increase in drug resistance was observed in individuals diagnosed with HIV.	PrEP is effective as a population-level intervention in preventing HIV among high-risk MSM groups, though its implementation requires attention to accessibility and broader coverage reporting.
(Wong et al., 2023)	Asia (Singapore, Tiongkok, Korea Selatan)	Review Article	HIV Late Presenters in Asia: Management and Public Health Challenges	Data from observational studies and literature reviews	A comprehensive review of the challenges in managing HIV in late-diagnosed patients in Asia, using epidemiological data and observational studies	34–72% of HIV patients in Asia are diagnosed late, with the consequence of increased risk of opportunistic infections, higher mortality, and greater health costs.	Strategies are needed to increase public awareness, reduce stigma, and educate health professionals to encourage earlier testing and prevent late presentation.
(Atkins et al., 2022)	Kenya	Qualitative framework analysis	Health system opportunities and challenges for PrEP implementation in Kenya	104 participants, including PrEP service providers, peer educators, and program/district managers	Key informant interviews (KII) and focus group discussions (FGD), data were analyzed using the framework analysis method based on the PrEP Implementation Framework	Respondents highlighted the importance of communication, training, coordination, and leadership. Commodity security and research were mentioned less frequently.	PrEP implementation in Kenya requires strong leadership and efficient coordination, as well as leveraging data to improve service strategies.
(Miranda et al., 2023)	Brazil	Descriptive	Perspectives and challenges for mother-to-child transmission of HIV, hepatitis B, and syphilis in Brazil	Data from 85,470 pregnant women with HIV, 466,584 with syphilis, and 15,411 with hepatitis B; data on children affected by these	The study used publicly available secondary data from the Brazilian Ministry of Health information system to assess trends and	Trends show a decline in HIV infections in children and an increase in syphilis detection in pregnant women. HIV treatment coverage increased to	There are challenges in eliminating mother-to-child transmission of infections, especially for hepatitis B and syphilis. Brazil has approached

				infections from 2011 to 2021	challenges in eliminating mother-to-child transmission. The analysis included data on HIV, syphilis, and hepatitis B in pregnant women and children recorded over the past decade.	94% in 2021. Hepatitis B detection remained relatively stable in pregnant women, but there was a decline in hepatitis B vaccine coverage in children from 96% (2013) to 76% (2021). In addition, there was an increase in syphilis detection in children from 3.3 per 1,000 live births in 2011 to 9.9 per 1,000 in 2021.	the target of eliminating MTCT for HIV, but still needs to scale up strategies for hepatitis B and syphilis, including increasing access to antenatal care and vaccination, and integrating health surveillance. Other challenges include regional differences and challenges in reporting data.
(Corey et al., 2022)	USA	Literature review	Promise and Challenges of Checkpoint Inhibitor Therapy for Progressive Multifocal Leukoencephalopathy in HIV	53 cases of PML treated with checkpoint inhibitors (including 5 patients with HIV)	To review cases of PML treated with checkpoint inhibitors (ICIs), including potential impact on HIV patients. Data from clinical studies and published cases were analyzed to evaluate the effectiveness and risks of ICIs in HIV patients.	In 4 of 5 HIV patients treated with pembrolizumab there were positive results without adverse symptoms of PML-IRIS. However, one patient with nivolumab therapy experienced rapid clinical deterioration.	ICIs have shown promise in the management of HIV-associated PML, especially pembrolizumab. However, the risk of IRIS and heterogeneous outcomes highlight the need for predictive biomarkers and careful patient selection. Further studies are needed to better understand the role of ICIs in HIV-associated PML.
(Uwishe ma et al., 2022)	Multi country	Review	Neurological disorders in HIV: Hope despite challenges	-	This article reviews HIV-related neurological disorders based on a literature review of several databases. Data were	Although antiretroviral therapy is effective in reducing the neurological manifestations of HIV, patients remain at high risk for neurological	HIV remains a serious global health challenge. Antiretroviral therapy reduces neurological symptoms, but the risk of neurological

					taken from studies examining neurological disorders in HIV patients.	complications, including HAND and opportunistic infections.	impairment remains high. Preventive measures are needed to minimize neurological complications in HIV patients as the 2030 target of achieving undetectable HIV levels is achieved.
(Salles et al., 2023)	Brazil	Qualitative	Contextualizing and optimizing novel strategies to improve the latent TB continuum of care	110 in-depth interviews (IDI) from 3 cities (Rio de Janeiro, Manaus, Sao Paulo)	In-depth interviews with PLHIV, health care providers (HCPs), and key informants. Thematic analysis was conducted, using case summaries and comparisons of themes across populations and geographic contexts.	QFT+ and 3HP are recognized as effective tools in improving continuity of care for latent TB. However, challenges exist such as health system constraints, HCP education, and sustainability of supply of materials.	Health education, optimization of clinical logistics, and improved patient-HCP communication are needed to optimize the implementation of QFT+ and 3HP in order to reduce TB mortality among PLHIV in Brazil.
(Thompson et al., 2024)	USA	Review	HIV-Associated Neurocognitive Disorder: A Look into Cellular and Molecular Pathology	Literature study on the molecular mechanisms and pathology of HAND	A literature review analyzing HIV-associated neurocognitive disorders (HAND), including HIV infiltration into the central nervous system, blood-brain barrier (BBB) disruption, immune cell activation, and HAND biomarkers.	HAND is caused by HIV penetration into the central nervous system that disrupts the BBB, activates microglia, and releases inflammatory cytokines. The presence of a latent reservoir of HIV in microglial cells results in chronic neuroinflammation that affects cognitive function.	The “shock and kill” and “block and lock” strategies are the main approaches to overcome the latent HIV reservoir in the brain. However, optimal therapy that can penetrate the BBB and effectively suppress inflammation is still needed to prevent the development of HAND.
(Dawson-Rose et al., 2020)	Mozambique	Qualitative	Capacity building, local ownership and implementation of a multi-level HIV/AIDS positive health, dignity, and	Study of PP initiatives at various levels (national, provincial, community)	A three-tier approach based on a socio-ecological model encompassing activities at	The successful implementation of Positive Prevention (PP) was achieved by creating a support system at various	Involving multiple levels of influence in the implementation of PP is essential to

			prevention initiative in Mozambique		the national, provincial and community levels. Involving collaboration with the Ministry of Health and local partners to build local capacity and ownership in HIV/AIDS prevention initiatives.	levels. There was an increase in knowledge, skills of health care providers, and behavioral changes among individuals and communities. PP was also included in the MOH curriculum and national data collection system.	maximize the effectiveness of this initiative. The principle of local ownership must be considered so that the PP program can achieve maximum and sustainable impact. The implementation of the socio-ecological model increases long-term capacity for HIV/AIDS prevention and care in Mozambique.
(Bauquier & Préau, 2021)	Prancis	Review	Contribution of HIV/AIDS-Related Human and Social Sciences Research to a Better Understanding of the Challenges of Hepatitis B Prevention, Diagnosis and Care	-	Literature analysis on the contribution of social and human science research related to HIV/AIDS to challenges in hepatitis B prevention, diagnosis, and care.	Highlights that social science research applied to HIV/AIDS can provide important insights to address challenges in hepatitis B prevention and care. Three key areas discussed are access to screening, retention in care, and measuring quality of life in clinical trials.	A multidisciplinary approach involving human social science research, biomedical sciences, and community-based approaches is essential to support hepatitis B prevention and care, particularly with a focus on understanding patient experiences and improving access to care.
(Mnjowe et al., 2024)	Malawi	Review	Assessing the Effect of Health System Resources on HIV and Tuberculosis Programmes in Malawi: A Modelling Study	Malawi population simulation data	Using an individual-based simulation model, Thanzi la Onse, to project the health impacts of a scale-up of HIV and TB programmes in Malawi under three health	In the no-constraints scenario, HIV and TB incidence is projected to decline significantly by 2033. However, if there are limitations in access to drugs, approximately 58,700 additional deaths from	This study emphasizes the importance of strengthening health systems at the scale of HIV and TB programs, especially drug availability, to achieve UNAIDS and WHO targets in Malawi.

					resource availability scenarios.	AIDS and TB are anticipated in the study period.	
(Riggs et al., 2022)	Amerika Serikat	Observasional	Lessons for Understanding Central Nervous System HIV Reservoirs from the Last Gift Program	19 HIV patients who donated body tissue after death	Using rapid autopsy of tissue from HIV-positive individuals at the end of life to study the HIV reservoir in the central nervous system (CNS). The analysis involved droplet digital PCR, genome sequencing, and bioinformatic methods to track the distribution of HIV in the body.	Variability of HIV reservoirs was found throughout the CNS with different levels of HIV DNA in different regions. Migration of HIV DNA from brain tissue to the systemic circulation was also detected, indicating the risk of viral rebound from the CNS reservoir.	The HIV reservoir in the CNS is heterogeneous, and migration of HIV from the CNS throughout the body may contribute to potential viral rebound if this reservoir is not targeted in HIV treatment strategies.
(Razzaq et al., 2024)	Fiji	Qualitative	Understanding Fijian Health System Challenges in the Prevention of Mother-to-Child Transmission of HIV Services in Fiji	58 health workers	In-depth interviews with health workers in three major hospitals and associated clinics in Fiji; thematic analysis.	Health workers face challenges such as lack of human resources, limited training, and shortages of medical equipment, including HIV reagents.	These health system challenges impact the quality of PMTCT services in Fiji; strategies are needed to increase resources and training for health workers.
(Alvim et al., 2023)	Brazil	Deskriptif, Eksploratori	Enfrentamento de HIV/aids e sífilis em mulheres venezuelanas migrantes na perspectiva de gestores de saúde no Norte do Brasil	10 health managers (5 from Boa Vista, 5 from Manaus)	The study was conducted between January and March 2021 in Boa Vista (Roraima) and Manaus (Amazonas). Interviews were conducted using a qualitative approach and analyzed using thematic content analysis techniques.	Interview results revealed three main themes: health care infrastructure, challenges faced by Venezuelan migrant women (e.g., language, documentation, change of address), and strategies and expectations for future HIV/AIDS and syphilis management. Language barriers and lack of	Although Brazil's health system is universal and serves all, language and documentation barriers remain obstacles. This study highlights the need for public policies that focus on addressing the difficulties faced by migrant women, especially in accessing HIV and syphilis-

						documentation can hinder access to health care.	related health services in the area.
(Chem et al., 2022)	Sub-Saharan Afrika	Review	Health-related needs reported by adolescents living with HIV and receiving antiretroviral therapy in sub-Saharan Africa: a systematic literature review	32 studies involving adolescents living with HIV receiving antiretroviral therapy (ART) in 11 countries	Researchers searched for articles reported from 2003 to 2020 across six major databases. These articles were analyzed using thematic analysis to identify HIV-related health needs in adolescents.	Key needs include psychosocial needs (such as stigma and difficulties in disclosing HIV status), dependency on care, the need for youth-friendly health services, food and financial support, adequate information about HIV, and growth and development needs.	Interventions to meet the health needs of adolescents with HIV should include psychosocial support, strategies to address stigma, and provision of health services that are responsive to adolescents' needs. Emphasis on family and community support is also important.

Discussion

From the implementation of pre-exposure prophylaxis (PrEP) in Scotland to the management of HIV in late-diagnosed patients in Asia, each study provides important insights that highlight the complexity and diversity of approaches to fighting HIV/AIDS. The study by Claudia Estcourt et al. (2021) show that PrEP has proven effective in reducing HIV transmission, the PrEP Program demonstrated a positive impact on reducing HIV rates among MSM in Scotland, particularly in high-risk groups. However, this study has limitations, such as variations in HIV testing data and a lack of detailed sexual behavior data. Implementation of the PrEP program in Scotland has been successful in reducing the incidence of HIV among MSM, especially among those at high risk. This shows the importance of widespread access to PrEP in controlling the HIV epidemic.

Further, challenges in early HIV detection are highlighted by Wong et al. (2023), who studied cases of late-diagnosed HIV in several Asian countries, including Singapore, China, and South Korea. This study found that delayed diagnosis is often associated with higher risks of opportunistic infections, increased mortality rates, and a greater burden on healthcare costs. The high proportion of patients diagnosed at an advanced stage (34-72%) underscores the need for more effective approaches to promote early testing, reduce stigma, and raise awareness among the public and healthcare professionals about the importance of early detection. Such approaches are expected to improve patient survival rates and reduce the costs of HIV management in these countries.

Another study by Miranda et al. (2023) in Brazil emphasizes the importance of interventions focused on preventing mother-to-child transmission (MTCT) in pregnant women infected with HIV, hepatitis B, and syphilis. Findings indicate that HIV treatment coverage has increased to 94% in 2021; however, significant challenges remain in addressing syphilis and hepatitis B. The rise in syphilis cases among pregnant women and children in Brazil points to the need for improvements in healthcare systems, particularly in early detection and vaccination. This research underscores the importance of a comprehensive and integrated preventive approach to addressing MTCT, as well as the need for equitable access to healthcare services for vulnerable populations, especially in Brazil's geographically vast and diverse context.

In terms of treatment and care, Corey et al. (2022) and Thompson et al. (2024) explore the challenges related to neurological disorders in HIV patients. Corey et al. examine the use of innovative therapies with checkpoint inhibitors (ICIs) for treating progressive multifocal leukoencephalopathy (PML) in HIV patients. While ICIs such as pembrolizumab show promising results in addressing PML, this therapy requires careful patient selection due to potential serious side effects, such as immune reconstitution inflammatory syndrome (IRIS). Thompson et al.'s study highlights the need for the development of therapies that can cross the blood-brain barrier (BBB) to address HIV-associated neurocognitive disorders (HAND). These studies underscore the necessity of a multidisciplinary approach involving biomedical and social sciences to develop more effective and targeted care strategies for managing neurological complications in people living with HIV.

Meanwhile, Razzaq et al. (2024) highlight the challenges in providing HIV prevention services for mother-to-child transmission in Fiji. This study finds that limited healthcare resources and inadequate training for healthcare workers are major obstacles to service quality. Additionally, the study by Dawson-Rose et al. (2020) in Mozambique shows that a multi-level approach involving government, communities, and local healthcare providers can improve the effectiveness of HIV prevention programs through empowerment and training at all levels. Both studies emphasize the importance of strengthening inclusive and collaborative healthcare systems to ensure equal access and optimal service quality for all populations vulnerable to HIV.

Conclusions

Based on this systematic review, it can be concluded that these studies provide valuable insights into various approaches to addressing HIV/AIDS tailored to local needs and diverse population groups. The implementation of PrEP, early detection strategies, strengthening of healthcare systems, and interventions focused on specific populations such as pregnant women, adolescents, and migrant groups have proven essential for the global success of HIV management. Furthermore, supportive policy development and active involvement of local communities are also crucial factors for the sustainability of HIV/AIDS programs and for preventing its spread.

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