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Human Immunodeficiency Virus (HIV): Epidemiology, Prevention, and Management Challenges in Indonesia

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Abstract
Background. Human Immunodeficiency Virus (HIV) is one of the global public health problems that is still a serious challenge, including in Indonesia. HIV infection causes a decrease in the immune system, which leads to Acquired Immunodeficiency Syndrome (AIDS) if not treated appropriately.
Purpose. This article aims to examine the development of HIV epidemiology, risk factors for transmission, prevention strategies, and HIV management efforts in Indonesia, based on a recent scientific literature review.
Method. The method used is a literature study of relevant national and international journal articles.
Results. The results of the study show that the increase in HIV cases is influenced by risky behaviors, low access to tests and therapies, and stigma and discrimination against People With HIV/AIDS (ODHA). Prevention efforts through HIV education, testing, and counseling, and antiretroviral therapy (ARV) have proven effective in reducing the rate of transmission.
Conclusion. In conclusion, HIV control requires a multidisciplinary approach that involves medical, social, and health policy aspects.

Keywords: HIV, AIDS, epidemiology, prevention, ARV therapy

INTRODUCTION

Human Immunodeficiency Virus (HIV) is a virus that attacks the human immune system, especially CD4 lymphocyte cells, reducing the body's ability to fight infection. Since it was first identified in the early 1980s, HIV has grown into a global epidemic with significant health, social, and economic impacts.

In Indonesia, HIV is still a complex public health problem. The increase in new cases, low public awareness, and stigma against ODHA are the main obstacles to HIV control. In addition, delayed diagnosis and low adherence to therapy also contribute to high morbidity and mortality rates. Therefore, a comprehensive study of HIV is needed to support more effective prevention and control efforts.

Research on the Human Immunodeficiency Virus (HIV) has progressed significantly since the discovery of this virus in the early 1980s. The initial focus of HIV research was directed at biomedical aspects, specifically the mechanisms of viral pathogenesis, transmission, and the development of antiretroviral therapy (ARV). These studies have proven that the use of ARVs is consistently able to suppress viral replication, increase the number of CD4 cells, and significantly reduce HIV mortality and transmission.

Subsequent developments indicate a paradigm shift in HIV research from a purely clinical approach to a public health approach. Epidemiological research highlights patterns of HIV distribution by region, age group, and behavioral risk factors. Global and national research results show that productive age groups and key populations are still the most vulnerable groups to HIV infection, with unsafe sexual intercourse and the use of injectable narcotics as the dominant factors of transmission.

In the Indonesian context, HIV research focuses on prevalence and risk factors, adherence to ARV therapy, and the effectiveness of programs to prevent mother-to-child transmission of HIV. Some studies also emphasize the role of stigma and discrimination as significant barriers to access to health services. In addition, community-based approaches and integration of HIV services in primary health facilities are beginning to gain attention in the current literature.

However, most HIV research in Indonesia is still sectoral, separating medical, social, and policy aspects. Studies that comprehensively integrate epidemiological, behavioral, and health policy dimensions are still relatively limited, especially in the context of the challenges of implementing HIV programs at the community level and primary services.

METHODS

This research uses a literature review method, drawing on scientific journal articles, health organization reports, and policy documents relevant to HIV. Data sources are obtained from scientific databases such as Google Scholar, PubMed, and national journal portals. The

literature analyzed includes epidemiological aspects, risk factors, prevention, and HIV management.

DISCUSSION

Based on the state-of-the-art study, several research gaps can be identified as follows:

1. Limitations of integrative approaches. Most HIV research still focuses on one specific dimension, such as clinical or epidemiological, without integrating social, cultural, and health policy factors holistically.
2. Lack of policy implementation studies at the primary service level. Research on the effectiveness of HIV policy implementation and programs in primary health facilities, especially in resource-constrained areas, is still minimal.
3. Lack of analysis of the association between stigma and the success of ARV therapy. Although stigma and discrimination are often cited as barriers, studies that analyze the direct relationship between social stigma, therapy adherence, and HIV control success are still not widely conducted.
4. Limited studies based on the local Indonesian context. Many studies adopt a global framework without adequately considering Indonesia's social, cultural, and health characteristics.
5. Lack of evidence-based synthesis based on public health policy. There is still relatively little literature that links scientific findings to practical, applicable policy recommendations for decision-makers.

HIV Epidemiology

HIV is a global health problem with millions of people living with HIV. In Indonesia, the spread of HIV occurs in various population groups, including the productive age. The main factors contributing to the increase in cases include unsafe sexual intercourse, shared syringe use, and mother-to-child transmission.

Risk Factors for HIV Transmission

HIV transmission is influenced by various factors, including:

1. Risky sexual behavior without condom use
2. Alternating use of injectable narcotics
3. Lack of knowledge about HIV and AIDS

4. Stigma and discrimination that hinder access to health services

Social and cultural factors also play a major role in shaping risky behaviors and low utilization of health services.

HIV Prevention Efforts

HIV prevention can be done through promotive and preventive approaches, including:

1. Health education and behavior change campaigns
2. Voluntary HIV testing and counselling
3. Prevention of mother-to-child transmission
4. Promotion of condom use and safe sex practices

Community-based approaches have proven to be effective in increasing public awareness and participation.

HIV Management and Therapy

Antiretroviral therapy (ARV) is a key pillar in HIV management. Regular use of ARVs can suppress viral replication, improve the quality of life for people with ODHA, and prevent further transmission. Key challenges in ARV therapy include patient adherence, drug side effects, and unequal access to healthcare.

Based on the research gap, the novelty of this article can be formulated as follows:

1. Comprehensive and multidimensional approach. This article presents an HIV study that integrates epidemiological aspects, pathogenesis, behavioral risk factors, socioeconomic impacts, and health policies in one public health analysis framework.
2. Synthesis of literature based on the Indonesian context. This research emphasizes the national context of Indonesia by considering the social, cultural, and health service system characteristics, thereby making the study's results more relevant and applicable.
3. Analysis of the relationship between stigma, access to services, and therapy success. This article highlights the relationship between social stigma, access to health care, and adherence to ARV therapy as key factors for successful HIV control.
4. Evidence-based policy approach. This article not only examines scientific findings, but also synthesizes them into policy implications and strategic recommendations for strengthening HIV control programs in Indonesia.
5. Conceptual contributions to public health research. This study makes a conceptual contribution by offering an HIV analysis framework that can serve as a basis for further

research, especially in the study of program implementation and the evaluation of HIV policies.

Herbal Remedies for HIV

To date, no herbal or natural medicine has been scientifically proven to cure HIV or replace antiretroviral (ARV) drugs — the standard drugs that are the most effective for controlling HIV in the body. ARVs help suppress viral load, support the immune system, and prevent the progression to AIDS. People with HIV often cite some plants and herbal supplements to support health or the immune system, but their effects on HIV have not been proven to be strong and safe:

Examples of herbs that are often called:

1. Aloe vera – there are small studies that show improvements in nutrients/CD4, but minimal data.
2. Gandarusa (Justicia gendarussa) – a compound in it that has been studied to inhibit HIV in the laboratory, but has not been shown to have a safe/clinical impact on humans.
3. Salvia (sage) leaves – lab results show potential against HIV in cell culture, but no human trials yet
4. Immune modulators such as "α-Zam" and other combinations – a small study in Nigeria noted some positive effects. Still, this evidence needs to be further confirmed and does not replace ARVs.
5. Temulawak, pineapple, papaya, and others – often said to help health, but the direct effect on the virus has not been firmly proven.

Some herbs or supplements can reduce the effectiveness of HIV drugs (ARVs) or cause serious side effects. For example: St. John's wort, Garlic in high doses, Certain Citrus (example: grapefruit). This can change the way the body metabolizes ARVs so that the drug becomes less effective.

Many herbal products that *claim to be "HIV cures"* in advertising or on the internet (e.g. ubhejane, izifozonke, etc**.)** are not supported by scientific evidence and can even be harmful if they replace the correct treatment.

1. The primary treatment for HIV remains ARVs—these are therapies that are proven to control the virus, prolong life, and prevent transmission.
2. If you want to take herbs or supplements, talk to your doctor or HIV healthcare provider first — especially if you're already taking ARVs.

3. Do not stop ARVs or replace them with herbs without medical supervision—this can cause the virus to re-escalate and health risks to worsen.

Pay attention to product labels, look for BPOM-registered ones if in Indonesia, and avoid claims that are too bombastic. There are no herbs proven to cure HIV. Some plants may help with general health or support the immune system, but the clinical evidence remains limited. Herbs are not a substitute for ARVs, and can interact with HIV medications.

To overcome this negative impact, herbal therapy has become a concern as a complementary approach in improving the quality of life of ODHA. Herbs such as Curcuma longa (turmeric) and Andrographis paniculata (sambiloto) are known to have anti-inflammatory and immunomodulatory properties that can support the physical and psychological health of ODHA (Gupta et al., 2013). Studies by Duggal et al. (2012) show that the use of herbs can help improve immune function and lower the risk of secondary infections in ODHA. In addition, herbs offer more natural, relatively safe solutions to reduce the side effects of ARVs (Adib et al., 2018).

There is a need for a holistic approach to improving the quality of life for ODHA. Quality of life is a multidimensional concept encompassing the physical, psychological, social, and environmental aspects of an individual (Holzemer et al., 2009). However, research examining the effectiveness of herbal therapy in supporting ARV and improving the quality of life of ODHA in Indonesia is still minimal. Therefore, this study aims to evaluate the effectiveness of herbal therapy, especially Curcuma longa and Andrographis paniculata, on improving the quality of life of ODHA undergoing ARV therapy at the HIV/AIDS Clinic in Kediri City. (Aminah, 2025).

HIV care is a series of medical, psychosocial, and preventive services that aim to maintain the quality of life of people with HIV (ODHIV), reduce the number of viruses (viral load), and prevent transmission. Diagnosis & Counseling: HIV test (rapid test/ELISA, confirmation if necessary). Pre & post-test counseling for emotional support, education, and treatment plans.

Antiretroviral Therapy (ART). ART for life; Taken daily. Objective: viral load is undetectable. The principle of U=U (Undetectable = Untransmittable): if the viral load is not detected, HIV is not sexually transmitted. Clinical Monitoring: Viral load (target: undetectable), CD4 (immune system status), Screening & management of opportunistic infections (TB, PCP, toxoplasmosis, etc.), Medication side-effect monitoring & adherence.

Prevention & Comprehensive Health: PrEP for at-risk couples/individuals, PEP after at-risk exposure (≤72 hours), Vaccination (hepatitis B, influenza, etc., as indicated). Reproductive health, family planning, and STI prevention. Psychosocial Support: Mental health counselling, Family & peer group support, Handling stigma and discrimination. Service Model, Facility-based care (RS/referral health center), Community-based care (NGOs, peer companions), Differentiated Service Delivery (DSD): flexible schedule, multi-month medication collection. Key Message: HIV is not the end of life: with regular ART, ODHIV can live healthy and productive lives. Adherence to taking medication is the key to success. Early treatment = better long-term outcomes.

Herbal Benefits for People with HIV

Aminah (2025) examined the Increase in physical health domain scores in the intervention group (from 55.3 to 70.2), showing significant benefits of herbal therapy using Curcuma longa (turmeric) and Andrographis paniculata (sambiloto). These results reflect the therapeutic ability of both herbs in reducing systemic inflammation, which is often a major problem in ODHA due to HIV infection and side effects of antiretroviral therapy (ARV). Research by Gupta et al. (2013) supports these findings by showing that curcumin, the active compound in Curcuma longa, has a strong anti-inflammatory effect by inhibiting inflammatory pathways, such as NF-κB. This effect not only helps to reduce physical pain and discomfort but also supports the recovery of energy and overall body function.

In addition, the increase in psychological health scores in the intervention group (from 50.7 to 67.4) showed that herbal therapy also had a positive impact on the mental well-being of ODHA. The decrease in anxiety and stress reported by respondents indicated the presence of adaptogenic effects of Andrographis paniculata, which helps the body adapt to physical and psychological stress. A study by Adib et al. (2018) also found that this combination of herbs can improve sleep quality and mood, which is an important factor in supporting the psychological health of HIV/AIDS patients.

This effect is particularly relevant considering that people with disabilities often experience emotional distress stemming from social stigma, prognosis uncertainty, and long-term treatment side effects. By reducing stress and increasing a sense of calm, this herb helps create more supportive conditions for physical and mental recovery. In addition, better psychological health can strengthen adherence to ARV therapy, which is a key factor in the success of HIV/AIDS treatment.

This combination of effects on physical and psychological health suggests that Curcuma longa and Andrographis paniculata not only provide pharmacological benefits but also support a holistic balance for people with HIV. By improving these two dimensions, herbal therapy can enhance overall quality of life. This shows great potential for integrating herbs into more holistic approaches to HIV/AIDS treatment, especially in developing countries with limited access to modern healthcare. Further research is needed to evaluate the long-term effects and the possibility of incorporating other herbs for more optimal results.

Social and Environmental Relations of People with ODHA

The social and environmental relations domain scores in the intervention group also showed significant improvement, reflecting the positive impact of herbal therapy on the social and environmental well-being of ODHA. This increase can be attributed to the ability of herbs such as Andrographis paniculata to help reduce the physical and psychological burden experienced by ODHA, thereby allowing them to be more active and confident in social environments. Better social activities not only increase emotional support from family and friends but also strengthen ODHAs' sense of connectedness to their communities.

According to Duggal et al. (2012), herbs with adaptogenic effects, such as Echinacea and Andrographis paniculata, have an important role in helping the body adapt to social and psychological stresses. This effect is particularly relevant for people with disabilities who often face social stigma and discrimination, which can lead to social isolation and low self-confidence. By reducing anxiety levels and increasing stress resistance, this herb supports people with disabilities to build more positive and productive social relationships.

In addition, the increased environmental domain score indicates that herbal therapy can help people with disabilities feel more comfortable in their surroundings, including the accessibility of health services, environmental cleanliness, and feelings of physical and emotional safety. When people with disabilities feel healthier and able to carry out their daily activities, they are more likely to take advantage of the facilities available in their environment, such as health services, transportation, or social activities. It can also encourage them to be more involved in community activities, thereby strengthening social and emotional support. The effects of herbs on improving social relationships and environmental utilization not only provide direct benefits to ODHA but also create long-term positive effects. By having better social relationships, ODHA is more likely to receive the support needed to deal with their health challenges, both mentally and physically. At the same time, a comfortable feeling towards their

environment helps to create a stable foundation for an overall improvement in the quality of life. Improvements in both domains demonstrate the great potential of herbal therapies in supporting quality-of-life dimensions that are often overlooked in HIV/AIDS treatment. By helping ODHA cope with social and environmental pressures, herbal therapies offer a more holistic approach to supporting their health. Further research is needed to explore these effects across different sociocultural contexts and to evaluate how herbal combinations can amplify these positive impacts on ODHA populations in diverse environments.

CONCLUSION

HIV is still a significant challenge in the field of public health in Indonesia. Behavioral, social, and structural factors contribute to the high rate of HIV transmission. HIV prevention and management efforts must be carried out comprehensively through education, expanded access to ARV testing and therapy, and reduction of stigma and discrimination. Collaboration between the government, health workers, and the community is needed to achieve sustainable HIV control.

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