

## Effectiveness of the Multimodal Educational Model in Improving Adherence to Antiretroviral (ARV) Therapy: A Systematic Review

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### ABSTRACT

Adherence to antiretroviral (ARV) therapy is a key determinant of successful HIV management; however, non-adherence remains common due to limited knowledge, low motivation, and insufficient educational support. This literature review aims to analyze the effectiveness of various health education models in improving knowledge and adherence among patients with HIV undergoing ARV therapy. The literature search was conducted through PubMed, ScienceDirect, Google Scholar, SINTA, and DOAJ, and five articles that met the inclusion criteria were analyzed using a narrative approach. The findings indicate that audiovisual education, tutorial-based learning, self-directed education, adolescent counseling, as well as psychosocial and behavioral interventions consistently improve patients' knowledge and adherence. Among all models, the multimodal approach demonstrates the most significant outcomes, as it addresses cognitive, emotional, and behavioral aspects comprehensively. In conclusion, multimodal education is recommended as a primary strategy to support the success of ARV therapy and to enhance the quality of life of individuals living with HIV.

**Keyword:** HIV, ARV, health education, adherence, multimodal

## INTRODUCTION

Human Immunodeficiency Virus (HIV) remains one of the greatest public health challenges globally and in Indonesia. Although antiretroviral (ARV) therapy has been proven effective in suppressing viral replication, enhancing immune function, and reducing the risk of transmission, the success of this treatment largely depends on patients' adherence to consistently taking their medication. Optimal adherence is defined as exceeding 95%; however, numerous studies indicate that many patients face difficulties in maintaining this level of adherence. Factors such as limited knowledge about HIV and ARV therapy, low motivation, social stigma, fear of side effects, and inadequate social support are among the primary causes of non-adherence. Therefore, health education interventions are considered a crucial strategy to address these barriers.

Various national and international studies have highlighted the role of education in improving patients' understanding and behavior related to ARV therapy. The first article by Permata Sari (2025) emphasizes the importance of providing education from adolescence, a group that is particularly vulnerable to HIV transmission and misconceptions about treatment. Through structured HIV counseling, the study demonstrated a significant increase in adolescents' knowledge regarding risks, prevention, and ARV therapy. Education at this stage not only serves as a preventive measure but also lays a foundation of understanding that may later influence attitudes and adherence should they require ARV therapy in the future.

At the healthcare level, Fresia's (2016) research offers substantial evidence regarding the efficacy of audiovisual and tutorial-based education in enhancing HIV patient adherence to antiretroviral therapies (ARVs). The integration of audiovisual materials and tutorials yielded the most significant improvement in adherence rates when contrasted with conventional educational methods. Audiovisual media facilitates patient comprehension of medical information by virtue of its engaging and

interactive format, whereas tutorials afford opportunities for direct counseling and support, enabling patients to rectify any misconceptions. Collectively, these two approaches reinforce one another, thereby fostering a more effective educational process.

The study conducted by Rainuny & Imba (2024) further clarifies that educational interventions do not necessarily have to be delivered face-to-face. Self-directed education containing information on medication guidelines, dosage, administration schedules, and potential side effects of ARV therapy has also been shown to significantly improve patients' knowledge. The proportion of patients categorized as having good knowledge increased more than threefold following the intervention. The flexibility of self-directed education allows patients to learn according to their individual needs, timing, and readiness, making this model particularly suitable for implementation in primary healthcare settings or in regions with limited healthcare workforce resources.

In addition, two international articles provide a broader perspective on the importance of psychosocial aspects in ARV adherence. Spaan et al. (2020), in their systematic review, demonstrated that motivation-based psychosocial interventions, counseling, and social support have a significant impact on improving adherence among both adolescents and adults. This finding is consistent with Mills (2021), who reported that behavioral and educational interventions grounded in behavior change theory are effective in enhancing long-term adherence, as they assist patients in establishing routines, strengthening self-efficacy, and overcoming emotional barriers. These two international studies underscore that education should not solely focus on the transfer of information, but must also address the emotional, social, and behavioral factors that influence the adherence process.

The five articles analyzed demonstrate a consistent pattern: education, in its various forms, consistently exerts a positive impact on improving knowledge and adherence; however, its level of effectiveness varies

depending on the method employed. Audiovisual and tutorial-based education have proven to be the most effective in enhancing adherence. Self-directed education is effective in building foundational understanding. Adolescent counseling plays a crucial role in prevention and in shaping health-related behaviors. Meanwhile, psychosocial and behavioral interventions contribute significantly to fostering long-term commitment to therapy.

Therefore, this review is essential to synthesize these findings in order to identify the most effective and comprehensive health education model. By understanding the strengths and limitations of each educational approach, healthcare professionals particularly nurses as the frontline providers of HIV services can design educational strategies that are more targeted, sustainable, and responsive to patients' needs. This literature review is expected to serve as a foundation for the development of multimodal education programs that not only enhance knowledge, but also promote attitudinal and behavioral changes that support the long-term success of ARV therapy.

## METHOD

This study is a systematic literature review conducted in accordance with the PRISMA 2020 guidelines. The focus of the review was defined using the PICO approach to clarify the direction of the article search and selection process. In the Population component, this study targeted individuals living with HIV who were undergoing antiretroviral (ARV) therapy. The Intervention included various health education models, such as audiovisual education, tutorial-based education, self-directed education, HIV counseling for adolescents, as well as psychosocial and behavioral interventions. The Comparison consisted of standard education or conventional care without additional educational interventions. The predefined Outcome measures were improvements in knowledge and increased patient adherence to ARV therapy.

The article search was conducted through five scientific databases—PubMed, ScienceDirect, Google Scholar, SINTA, and DOAJ—using combinations of keywords related to HIV, ARV adherence, health education, audiovisual interventions, and psychosocial/behavioral education. The inclusion criteria comprised articles published between 2016 and 2024, intervention or quasi-experimental studies, as well as systematic reviews or meta-analyses evaluating the effectiveness of educational interventions on knowledge or ARV adherence, with full-text availability. Opinion articles, non-educational studies, and publications without outcome data were excluded.

Of the total 126 articles found, the screening process resulted in 44 articles for full-text assessment, and 5 articles met all inclusion criteria. The data extracted included study design, population, type of educational intervention, and main results. A narrative-thematic analysis was conducted to compare the effectiveness of each educational model in improving adherence and knowledge related to ARV therapy.

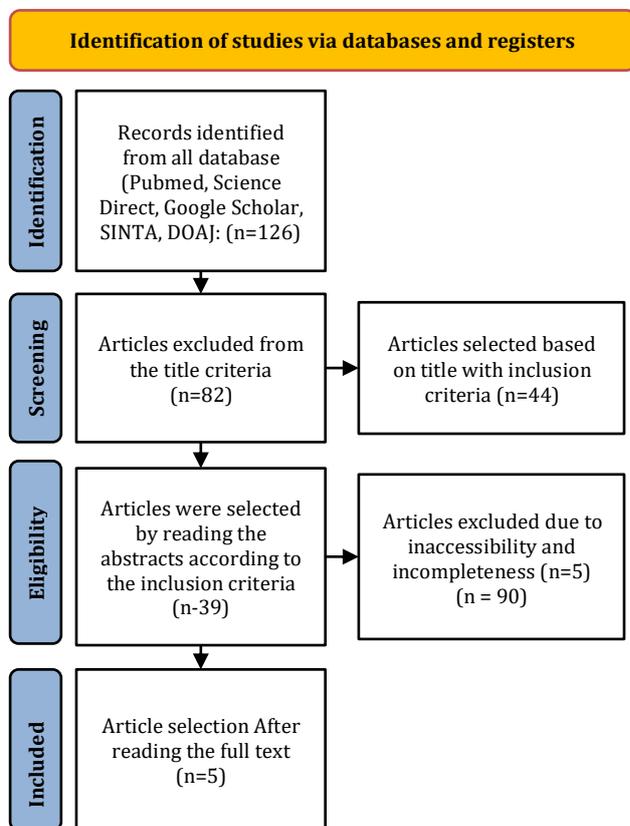


Figure 1 PRISMA Flow Diagram

**Table 1. Research Questions (PICO Framework)**

Key Elements	Description	Terms
P (Population)	HIV/AIDS patients undergoing antiretroviral (ARV) therapy	Patients living with HIV who are receiving ARV therapy
I (Intervention)	Health education interventions (audiovisual, tutorial, self-directed education, HIV counseling, psychosocial & behavioral interventions)	Various health education models, including audiovisual education, tutorial-based education, self-directed education, HIV counseling, as well as psychosocial and behavioral interventions
C (Comparison)	Standard/conventional education or no specific educational intervention	Standard/ conventional education without additional methods or without specific educational intervention
O (Outcome)	Improvement in knowledge and increased adherence to ARV medication	Improvement in knowledge and increased patient adherence to ARV therapy

**RESULT****Table 2. Data Extraction Results**

No	Author/ year	Design	Research Objective	Population	Intervention	Findings
1.	Permata Sari (2025)	Quasi-experimental (pre-posttest)	To assess the effectiveness of HIV education in improving adolescents' knowledge about HIV/AIDS and ARV therapy	School-age adolescents	HIV/AIDS counseling with structured educational materials	Significant increase in knowledge ( $p < 0.05$ ); adolescents better understood the risks and urgency of HIV prevention
2.	Fresia (2016)	Two-group quasi experimental	To evaluate differences in effectiveness between audiovisual education + tutorial and conventional lecture methods	Adult HIV patients undergoing ARV therapy	Educational audiovisual materials, direct tutorials, and conventional education	Audiovisual + tutorial combination showed the highest adherence improvement (difference of 3.67 points); audiovisual was more effective than lectures
3.	Rainuny & Imba (2024)	Pre-post test	To measure the effect of self-directed education on ARV understanding	HIV patients at primary healthcare centers	Self-learning educational module (dosage rules, administration, side effects)	Good knowledge category increased from 20.8% to 66.6%; self-education improved therapy readiness

4.	Spaan et al. (2020)	Systematic review & meta-analysis	To assess the effectiveness of psychosocial interventions on ARV adherence	HIV patients across various age groups	Motivational counseling, social support, behavior-based psychosocial interventions	Psychosocial interventions significantly improved adherence by increasing motivation and reducing emotional barriers
5.	Mills (2021)	Systematic review	To evaluate the impact of educational and behavioral interventions on long-term ARV adherence	Adult HIV patients	Educational interventions, behavior change theory, counseling	Educational + behavioral interventions improved long-term adherence by strengthening routines and self-efficacy

## DISCUSSION

Analysis of five articles that met the inclusion criteria showed that health education interventions—whether through audiovisual approaches, tutorials, self-directed education, youth counseling, or psychosocial interventions—consistently had a positive impact on increasing knowledge and adherence to antiretroviral (ARV) therapy. Although each method has different characteristics, all studies showed improvement in the measured outcomes, with varying levels of effectiveness.

Fresia's (2016) research shows that a combination of audiovisual education and tutorials is the most effective method for improving ARV adherence, with an increase of 3.67 points compared to conventional education. This effectiveness can be explained by the fact that audiovisual media can present complex material visually and make it easier to remember, while tutorials provide direct guidance that strengthens patients' ability to understand the ARV regimen.

These findings are in line with the results of Rainuny & Imba's (2024) study, which shows that self-education can also significantly improve patient understanding. The level of knowledge in the good category increased from 20.8% to 66.6% after the intervention. The flexibility of self-directed learning allows patients to study the material

at their own pace, thereby minimizing time constraints and barriers to accessing healthcare professionals. Although it does not directly measure compliance, increased knowledge is an important prerequisite in supporting changes in compliance behavior.

Meanwhile, Permata Sari's (2025) research highlights the importance of HIV education among adolescents, showing a significant increase in knowledge ( $p < 0.05$ ). Adolescents are a high-risk group who often have misconceptions about HIV and ARVs. Early education is not only curative but also serves as a preventive measure to shape long-term healthy behaviors.

At the psychosocial intervention level, Spaan et al. (2020) revealed that motivation, interpersonal counseling, and social support play an important role in improving ARV adherence. Psychosocial interventions work by addressing emotional factors such as stress, fear, stigma, and despair, which have been major barriers to adherence. The success of these interventions demonstrates that informative education alone is often insufficient without considering the psychological aspects of patients.

This is reinforced by Mills (2021), who stated that behavioral theory-based educational interventions have a more stable impact on long-term adherence. Behavioral approaches help patients establish

medication-taking routines, increase self-efficacy, and optimize their ability to maintain adherence despite external and internal barriers.

When compared collectively, the five articles show a consistent pattern that health education plays a crucial role in improving understanding and adherence to ARV therapy. However, the effectiveness of each method varies. Audiovisual education and tutorials have the greatest impact on adherence, self-directed education is highly effective in improving basic knowledge, adolescent education plays a role in prevention and long-term preparedness, while psychosocial and behavioral interventions have a broad impact on motivational and emotional factors.

From the synthesis of these results, it can be concluded that no single educational method is completely sufficient. The general pattern of all findings suggests that a combination of audiovisuals, tutorials, self-education, and psychosocial and behavioral approaches is the most comprehensive strategy. A multimodal approach can encompass cognitive (knowledge), affective (motivation and emotions), and behavioral (adherence) aspects, making it more effective in producing sustainable change.

## **CONCLUSION**

This literature review demonstrates that various health education models, both informative and psychosocial, play a significant role in improving HIV patients' knowledge and adherence to antiretroviral (ARV) therapy. The five articles analyzed—which included audiovisual education, tutorials, self-education, adolescent counseling, and psychosocial and behavioral interventions—showed a consistent pattern of findings that education is a key component in the success of ARV therapy.

Audiovisual and tutorial-based education has been shown to be the method that provides the greatest improvement in adherence, due to its interactive delivery and the involvement of direct support. Self-paced education effectively increases patients' basic understanding and provides high learning flexibility, while youth counseling plays a

crucial role as a preventive measure to build HIV literacy from an early age. Meanwhile, international evidence confirms that psychosocial and behavioral interventions not only improve understanding but also strengthen motivation, self-efficacy, and emotional support, which are crucial factors in maintaining long-term adherence.

Based on the synthesis of the five articles, it can be concluded that a multimodal educational approach, namely a combination of audiovisuals, tutorials, self-education, and psychosocial interventions, is the most effective and comprehensive strategy for improving adherence to ARV therapy. This approach is able to simultaneously address the cognitive, emotional, social, and behavioral aspects of patients, thus providing a stronger and more sustainable impact on therapy success.

Therefore, the implementation of structured, iterative, and interaction-based multimodal education programs is recommended for HIV care. Nurses and other healthcare professionals are expected to optimize these various forms of education to support the therapy process, improve patients' quality of life, and strengthen the overall success of HIV control programs.

## **RECOMMENDATION**

1. The implementation of multimodal education in ARV services needs to be improved, particularly the integration of audiovisuals, tutorials, self-education, and psychosocial interventions, which have proven to be most effective.
2. Training of healthcare workers, particularly nurses, in providing interactive education, motivational counseling, and behavior change approaches needs to be strengthened to improve the quality of patient support.
3. The development of digital educational media, such as educational videos, interactive modules, and medication reminder apps, is important to facilitate access to information and improve patient knowledge retention.
4. Education for adolescents and vulnerable populations should be expanded as a

preventative measure to improve HIV literacy from an early age.

5. The integration of psychosocial support into ARV programs needs to become a routine part of services to help patients overcome emotional and social barriers that affect adherence.
6. Further research is recommended to compare the effectiveness of combined interventions in more detail and assess their impact on long-term outcomes of ARV therapy.

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