International Journal of Health Science (IJHS)

E-ISSN: 2827-9603
P-ISSN: 2827-9603

Research Article

Antiretroviral Therapy Adherence among Patients with HIV/AIDS

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Abstract. The success of Antiretroviral (ARV) therapy is highly dependent on patients' discipline in taking medication consistently. Various factors, including self-efficacy, are believed to influence the patient's ability to maintain treatment routines. Poor adherence can reduce therapeutic effectiveness and increase the risk of treatment failure. This study aims to identify the relationship between self-efficacy with ARV therapy adherence among HIV/AIDS patients. This study employed a cross-sectional design involving 64 respondents at RSMD Soepardjo Roestam Semarang. Data were collected using questionnaires and analyzed with the Chi-Square test. Most respondents had low self-efficacy (51,6%), and low ARV therapy adherence (54,7%). Moderate adherence was found in 25% of respondents, while high adherence was found in 20,3%. Statistical analysis showed no significant relationship between ARV adherence (p = 0,291), nor between self-efficacy and adherence (p = 0,566). Other external factors are presumed to influence patients' adherence levels. and self-efficacy were not significantly associated with ARV therapy adherence among HIV/AIDS patients.

Keywords: Antiretrovirals; ARV; HIV Treatment; Self-Efficacy; Therapy Adherence.

1. Background

HIV *(Human Immunodeficiency Virus) is* a virus that infects the human immune system, impacting individuals, families, and society. AIDS *(Acquired Immunodeficiency Syndrome) is the* final condition caused by HIV infection . HIV is transmitted through blood, semen, vaginal fluids, and breast milk, which are all bodily fluids. Furthermore, the risk of transmission increases due to the shared use of needles and unsterile blood transfusions (Siagian et al., 2024) .

The World Health Organization (WHO, 2024) estimates that globally, by the end of 2023, there will be 39.9 million individuals in various countries living with HIV infection . In Indonesia, HIV/AIDS cases have been reported in almost all provinces. In the first quarter of 2023, 13,279 new HIV/AIDS cases were recorded, with 82% of them undergoing antiretroviral (ARV) therapy. In Central Java, specifically Semarang, 388 new cases were recorded throughout the year. (HIV-AIDS and STI Information System (SIHA), 2023) .

Based on a preliminary survey at Balkesmas (Semarang Regional Public Health Center) in January 2024 - May 2025, it was found that HIV / AIDS cases decreased in 2025. The number of HIV / AIDS cases at Balkesmas (Semarang Regional Public Health Center) in January - December 2024 recorded 197 HIV / AIDS cases and 17 people were referred so that the total number recorded was 180 HIV / AIDS cases, and there was a decrease in January - May 2025 recorded 185 HIV / AIDS cases or experienced a decrease of 21 people due to referrals so that the total number recorded was 165 HIV / AIDS cases, in 2024-2025 in May there were 7 people who were not routinely on ARV therapy, and 4 people experienced cases of *Loss to follow-up* or stopping ARV therapy which resulted in death, *Loss to follow -up or* death can be influenced by a number of other factors, including self-efficacy.

Received: August 21, 2025
Revised: October 15, 2025
Accepted: December 18, 2025
Online Available: February 9, 2026
Curr Ver: February 9, 2026

Previous studies have shown that adherence to ARV therapy tends to be better in patients with strong family support and high self-efficacy . Research at Palembang Hospital showed that 24% of non-adherent patients had low family support and 30.3% had low self-efficacy (Sitorus, 2022) . Conversely, research at the VCT Clinic found that 87.9% of patients with good family support were adherent to ARV therapy, while 87.5% with poor family support were non-adherent. (Fahmana et al., 2024) .

Antiretroviral (ARV) therapy has been proven effective in reducing the amount of HIV in the body and delaying the progression of the disease to AIDS. While the clinical effectiveness of ARV therapy is clear, individual challenges, particularly related to adherence to regular and continuous treatment, remain a significant obstacle.

Adherence to ARV treatment is crucial, given that ARV therapy is long-term and requires timely medication consumption to achieve maximum benefits. However, various factors can disrupt patient adherence, such as drug side effects, boredom from ongoing therapy, and a lack of understanding and personal motivation. Furthermore, stigma and discriminatory treatment of individuals with HIV/AIDS, both within society and within their families, often trigger psychological disorders such as fear, anxiety, shame, and stress. (Personal, 2023) . Conditions like this make them hide their HIV status and reluctant to access health services.

In this regard, family support and self-efficacy contribute significantly to improving patient adherence to antiretroviral (ARV) therapy . Family support, whether in the form of emotional, informational, appreciative, or instrumental support, can motivate consistent treatment adherence. Meanwhile, self-efficacy (a person's belief in their ability to manage their health) helps them overcome various obstacles during ARV therapy. Low self-efficacy can make it easier for someone to give up and make it difficult to be consistent with treatment.

Although ARV therapy is highly effective medically, low patient adherence is a problem that contributes to the gap between clinical effectiveness and actual outcomes. This situation underscores the importance of further research, particularly on the influence of family support and self-efficacy on ARV therapy adherence in HIV/AIDS patients.

2. Theoretical Study

HIV/AIDS

HIV (Human Immunodeficiency Virus) is a virus that targets the human immune system, specifically CD4 T cells, which play a crucial role in fighting infection . A CD4 T cell count below 200 cells/mm3 indicates a weakened immune system, categorizing the individual as AIDS. HIV transmission can occur through several pathways, including heterosexual and homosexual sexual intercourse. Transmission can also occur horizontally through blood exposure, such as during transfusions, or vertically from mother to baby. HIV-positive mothers can potentially transmit the virus to their babies during childbirth or through breastfeeding (Sutrasno et al., 2022) . The cause of HIV/AIDS is infection with the Human Immunodeficiency Virus (HIV0), a cytopathic virus belonging to the Retroviridae family, Lentiviridae subfamily, and Lentivirus genus. HIV is a type of retrovirus that has genetic material in the form of RNA with a size of around 0.7 kilobases. Based on its clarification, this virus is divided into two general categories, namely HIV-1 and HIV-2, each of which has various types. In the two categories being compared, HIV-1 is the most dominant type, is more virulent, and contributes the most to HIV/AIDS cases globally (Irsyah, 2022) . Appropriate treatment time and monitoring routine medical very important in managing HIV for prevent transition to AIDS stages and complications (Aprilia, 2023) .

According to AD Arvinda, 2024 , The HIV clarification system for HIV-infected adults based on WHO *(World Health Organization) guidelines* is as follows:

a. Clinical Stage I

   At this stage, the clinical manifestations that appear are in the form of conditions and symptoms (asymptomatic) as well as the presence of enlarged lymph nodes that persist.

b. Clinical Stage II

   At this stage, symptoms include moderate weight loss of <10%, upper respiratory tract infections *(bacterial sinusitis)* , one or more episodes in the last 6 months, herpes zoster, angular cheilitis, recurrent oral candidiasis (2 or more episodes), pruritic papules, seborrheic dermatitis, or fungal nail infections that have developed in the last 6 months.

c. Clinical Stage III

At this stage, clinical signs often include significant weight loss, more than 10% of initial body weight. Patients may also experience prolonged diarrhea without a known cause lasting more than 30 days, as well as prolonged fever, either intermittent fever above 37.6 ° C or persistent fever lasting more than one month. Oropharyngeal candidiasis, a history of pulmonary tuberculosis within the past year, and severe bacterial infections such as pneumonia and pyomyositis may also be present.

d. Clinical Stage IV

At this stage, patients may exhibit a variety of severe clinical manifestations related to opportunistic infections and systemic complications. Commonly encountered conditions include Pneumocystis pneumonia (PCP), recurrent bacterial pneumonia characterized by one or more episodes in the past six months beyond the current episode, and chronic herpes simplex infection lasting more than one month, either in the oral, genital, or anorectal areas, regardless of visceral organ involvement. Other manifestations include esophageal candidiasis, extrapulmonary tuberculosis, Kaposi's sarcoma, and cytomegalovirus infections such as retinitis or CMV involvement in organs other than the liver, spleen, and lymph nodes. Cerebral toxoplasmosis, HIV-associated encephalopathy, extrapulmonary cryptococcosis including meningitis, non-tuberculous mycobacterial infections, and *progressive multifocal leukoencephalopathy* (PML) may also be present. Other disorders that may arise include chronic cryptosporidiosis, isosporiasis and coccidioidomycosis, recurrent sepsis including due to non-typhoidal *Salmonella* , and malignancies such as non-Hodgkin's B-cell lymphoma, brain lymphoma, and other solid tumors associated with HIV. Additional manifestations that may also occur include invasive cervical cancer, atypical disseminated leishmaniasis, HIV-associated nephropathy (HIVAN), and symptomatic HIV-associated cardiomyopathy.

Several factors play a role in this, including the immune system's ability to fight HIV (such as the immune system's ability) in infected individuals (Patiiha, 2022) . An individual's internal belief in recovery or survival is a factor that can increase support for health. Self-efficacy plays a crucial role in the implementation of personal control, including control over personal health. Individuals with high levels of self-efficacy tend to believe they can recover (Suryanto & Nurjanah, 2021) . Resistance can arise due to high viral load, low CD4 counts, and non-adherence to therapy (Tiffany & Yuniartika, 2023) .

Self-Efficacy

Self-efficacy can be defined as a person's belief in their personal ability to carry out behaviors and make decisions necessary to achieve desired goals or specific outcomes, reflecting their belief in controlling various aspects that affect their lives. Self-efficacy can refer to a person's feelings, motivations, actions, and attitudes, and how they motivate themselves to behave in certain ways. One role of self-efficacy is to provide a person with confidence that they are capable of carrying out activities that optimally support their health (Mailani, 2023) . If an individual feels confident and believes in his abilities, he will be able to overcome challenges or obstacles in various expected conditions and situations, so that he is able to manage the anxiety and stress he experiences (Sinurat et al., 2023) .

According to (Silalahi et al., 2024) , there are several things that influence a person's self-efficacy, namely:

a. Culture

Values, beliefs, and self-regulatory processes serve as sources of self-efficacy assessments. These principles shape how individuals evaluate their self-efficacy and disregard outcomes related to their beliefs about self-efficacy. The impact of a person's culture can transform a fundamentally good individual into a bad or evil one.

b. Gender

Furthermore, gender differences influence an individual's level of independence. Women who perform tasks outside of their role as homemakers and have careers tend to be more efficient at managing their responsibilities than men who work.

c. Characteristics of the task at hand

Individuals' self-assessments of their abilities are influenced by the complexity of the task at hand. More challenging tasks will result in lower self-assessments, while easier and simpler tasks will result in higher self-assessments.

d. External intention

The intensity an individual receives can also influence their own capacity. One element that can increase an individual's capacity is ability, initiative, and intensity, where the intensity received from others reflects an individual's success.

e. Status or role in the environment

People with higher status typically exhibit greater control, reflecting high self-efficacy, whereas those with lower status tend to have lower control and self-efficacy.

f. Information about self-abilities

When information is presented to individuals with high self-efficacy, they tend to think positively about themselves. Conversely, if someone has low self-efficacy, they tend to think negatively about themselves.

Patients with high self-efficacy tend to view obstacles, such as missed medication or side effects, as surmountable challenges rather than reasons to give up. They are more proactive in seeking solutions to adherence issues, demonstrate persistence in maintaining medication schedules, and consistently engage in adherence-supportive behaviors, such as carrying medication or setting reminders. Furthermore, a sense of control over treatment can reduce the anxiety and helplessness often experienced by patients with HIV/AIDS, helping them remain emotionally stable and more adherent (Siagian et al., 2024) . Characteristics of someone with low self-efficacy include feelings of hopelessness, easily feeling sad, apathy, anxiety, a tendency to avoid challenging tasks, and giving up quickly when faced with obstacles (Laily & Wahyuni, 2018)

***Antiretroviral* Therapy Adherence**

Adherence is the act of someone using medication correctly regarding dosage, timing, and frequency. Following medication instructions also plays a significant role in preventing the emergence of resistance. Adherence to ARV treatment is defined as how well a person with HIV follows treatment, according to the instructions given by medical personnel. Optimal adherence is necessary to suppress viral replication and improve clinical and immunological status, reduce the possibility of ARV resistance, and reduce the risk of HIV transmission (Arizwansyah et al., 2023) . Although ARV therapy cannot eliminate the virus, it serves to slow the development of HIV and disease progression (Aresta & Jumaiyah, 2019) .

Factors that influence adherence to antiretroviral (ARV) treatment according to (Arizwansyah et al., 2023) :

a. Access to therapy
b. Personal Factors

Personal factors include negligence in taking medication, long journeys, changes in habits, depression or other health conditions, boredom in consuming alcohol or the use of drugs and other addictive substances.

ARV Drug Factors

Factors related to Antiretroviral (ARV) drugs include side effects, the number of drugs to be taken and dietary restrictions.

2. Research Methods

This study used a descriptive correlative design with a *cross-sectional approach* that aims to examine the relationship of self-efficacy support to adherence to antiretroviral therapy (ARV) in HIV/AIDS patients. Population is an object that includes the whole or subject that is the target of the study (Subhaktiyasa, 2024) . The study population was all HIV/AIDS patients undergoing ARV therapy at RSMD Soepardjo Roestam Semarang in the period January-May 2025, totaling 165 people. The sample determination was carried out using a non-probability purposive sampling technique with the Isaac and Michael formula calculation, resulting in a sample size of 116 respondents. Inclusion criteria included patients who were willing to be respondents, cooperative, and able to read and write, while exclusion criteria included patients with communication disorders or unable to read and write. The study was conducted at RSMD Soepardjo Roestam Semarang in March-December 2025.

Data collection was conducted using a structured questionnaire consisting of respondent characteristics, self-efficacy, and ARV therapy adherence questionnaires (MMAS-8). All instruments have undergone validity and reliability tests with *Cronbach's* Alpha values > 0.7, thus being declared valid and reliable. Data analysis was conducted univariately to describe the characteristics of respondents and the variables studied, and bivariate analysis using the *Chi-Square test* to determine the relationship between variables with a 95% confidence level (α = 0.05). This research was conducted by paying attention to the principles of research ethics, including the principles of benefit, respect for human rights, justice, and protection of privacy and confidentiality of respondents through the application of informed consent and data anonymity.

3. Results And Discussion

Table 1. Frequency Distribution of Respondents Based on Age of PLWHA at RSMD Soepardjo Roestam Semarang in September (n=64).

Variables	n	Mean±	Elementary School	Min-Max	95% CI
Age	64	37.25	8,065	19-57	35.24-39.26

Based on Table 1, the 64 respondents had an average age of 37.25 years (SD ± 8.065). The age range of respondents was 19-57 years, with a 95% CI of 35.24-39.26 years. This finding indicates that the majority of respondents were in the productive age group.

Table 2. Frequency Distribution of Respondents Based on Gender, Education, Family Type, Self-Efficacy, and Adherence to PLWHA Therapy at Soepardjo Roestam Semarang Regional General Hospital in September (n=64).

Characteristics	Category	Frequency (f)	Percentage (%)
Gender	Men	47	73.3
	Women	17	26.6
Education	SDD	1	1.6
	Junior High School	2	3.1
	SMAA	36	56.3
	D3/S11	25	39.1
Family type	Nuclear family	34	53.1
	Extended family	14	21.9
	Family "dyad"g	2	3.1
	Single parentt	7	10.9
	Single adult	7	109
Self-efficacy	Low	33	51.6
	High	31	48.4
Therapy adherence	Low	35	54.7
	Medium	16	25.0
	High	13	20.3

Based on gender distribution, of the 64 respondents, 47 (73.3%) were male, while 17 (26.6%) were female. This finding indicates that the majority of people living with HIV/AIDS (PLWHA) involved in the study at Soepardjo Roestam Semarang Regional General Hospital were male.

Based on educational level, the majority of respondents (36 respondents) had a high school education (56.3%). Respondents with a Diploma 3/Bachelor's degree (39.1%) were recorded, while 2 respondents (3.1%) had a junior high school degree, and only 1 respondent (1.6%) had an elementary school degree. These results indicate that the majority of PLHIV respondents in this study were in the secondary education category, namely high school.

Based on family type, the majority of respondents came from nuclear families, with 34 people (53.1%). Respondents living with extended families were recorded at 14 people (21.9%), while only 2 people (3.1%) were found in dyadic families. Furthermore, respondents with single parent and single adult status each numbered 7 people (10.9%). These findings indicate that the majority of respondents are in nuclear family structures.

Based on self-efficacy characteristics, 33 respondents (51.6%) were in the low confidence category, while 31 respondents (48.4%) had a high level of confidence. This finding indicates that

the proportion of respondents with low self-efficacy is still greater than those with high self-efficacy.

Based on the level of therapy adherence, the majority of respondents were in the low adherence category (35 people) (54.7%), followed by moderate adherence (16 people) (25.0%), and high adherence (13 people) (20.3%). These results indicate that the majority of PLHIV have not achieved optimal adherence to antiretroviral (ARV) therapy.

Table 3. Relationship between Self-Efficacy and Adherence to Antiretroviral (ARV) Therapy at RSMD Soepardjo Roestam Semarang in September (N=64).

Self-Efficacy	ARV Compliance Categories								p *Value*
	Low compliance		Moderate compliance		High compliance		Total		
	n	%	n	%	n	%	n	%	
Low confidence	16	25.0	9	14.1	8	12.5	33	51.6	0.566
High confidence	19	29.7	7	10.9	5	7.8	31	48.4	
Total	35	54.7	16	25.0	13	20.3	64	100.0	

The cross-tabulation results showed that respondents with low self-efficacy were mostly in the low adherence category of antiretroviral therapy (ARV) as many as 16 people (25.0%), followed by moderate adherence of 9 people (14.1%) and high adherence of 8 people (12.5%). In the group of respondents with high self-efficacy, there were 19 people (29.7%) with low adherence, 7 people (10.9%) with moderate adherence, and 5 people (7.8%) with high adherence. Statistical analysis using the Chi-Square test produced a p-value of 0.566 (p>0.05), which indicates that there is no significant relationship between self-efficacy and adherence to antiretroviral therapy (ARV), so it can be concluded that self-efficacy does not have a significant relationship with patient adherence in undergoing ARV therapy.

The Relationship between Self-Efficacy and Adherence to Antiretroviral (ARV) Therapy

The results of the bivariate analysis showed that there was no significant relationship between self-efficacy and adherence to antiretroviral (ARV) therapy in HIV/AIDS patients at Soepardjo Roestam Semarang General Hospital, as evidenced by *the Chi-Square test* with a *p-value* of 0.566 (p>0.05). This finding indicates that the patient's level of self-efficacy does not directly influence adherence behavior in undergoing ARV therapy. Patient adherence is more influenced by other factors, such as social stigma, drug side effects, long-term therapy saturation, and limited support from family, the environment, and health workers. The results of this study are in line with research (Sitorus, 2022) which obtained a *p-value* of 0.015 (p>0.05) and research (Priyantari & Rosyad, 2022) with a *p-value* of 0.023 (p>0.05), both of which showed no significant relationship between self-efficacy and adherence to ARV therapy. Thus, high self-efficacy does not necessarily guarantee patient compliance, because compliance behavior is more influenced by external factors and psychosocial barriers that interact with each other.

The results of this study show differences with the findings of (Made & Rini, 2019) which proved a significant relationship between self-efficacy and adherence to antiretroviral (ARV) therapy, with a *p-value* of 0.000 (p>0.05). In the study, respondents with high levels of self-efficacy tended to be able to maintain optimal therapy adherence, because they had confidence in managing medication consumption consistently, adjusting treatment schedules with daily activities, and integrating therapy into their daily routines. Similar findings were also reported by (Hosseini et al., 2024) which showed a significant relationship between self-efficacy and adherence to ARV therapy with a *p-value* of 0.001 (p>0.05), where patients with high self-efficacy generally had achieved self-acceptance of their HIV status and had a more stable psychological condition. These conditions made it easier for patients to motivate themselves, overcome emotional and physical obstacles, and maintain consistent therapy in the long term. Thus, self-efficacy, particularly in the ability to manage and carry out therapy independently, is an important factor contributing to the formation of compliant behavior in undergoing antiretroviral (ARV) therapy.

The overall results of the study indicate that self-efficacy does not have a significant relationship with adherence to ARV therapy in HIV/AIDS patients at RSMD Soepardjo Roestam Semarang, because adherence is more influenced by external factors than individual capacity, such as social stigma, drug side effects, family and health worker support, and the patient's psychological condition. Although several other studies have shown a relationship, the results of

this study confirm that high self-efficacy does not always guarantee adherence, especially when patients still face complex social and emotional barriers.

4. Conclusion And Suggestions

The results of a study on 64 respondents at Soepardjo Roestam Semarang Regional General Hospital showed that the majority of patients who adhered to ARV therapy had specific characteristics : male, aged 30–39 years, had a high school education, and came from nuclear families. Other findings showed that quite a number of patients received low levels of family support and had low self-efficacy, namely confidence in their ability to consistently undergo ARV therapy. This condition is in line with the results of the study which showed that the level of patient adherence in undergoing ARV therapy is still relatively low. In addition, the results of the statistical analysis showed that there was no significant relationship between self-efficacy and the level of adherence to ARV therapy, so self-efficacy was not proven to have a direct influence on patient adherence in this study.

This study is expected to provide additional information and references for health workers and researchers in assessing the relationship between self-efficacy and adherence to ARV therapy in HIV/AIDS patients at RSMD Soepardjo Roestam Semarang.

Thank-You Note

The author would like to thank RSMD Soepardjo Roestam Semarang for the permission and facilities provided, as well as all respondents who participated. Thanks are also extended to the supervisors Mr. Ns. Mohammad Arifin Noor, M.Kep., Sp.KMB., and Mr. Dr. Ns. Suyanto, M.Kep., Sp.KMB for their guidance and direction during the preparation of this article, as well as to the family and all parties who have provided moral support.

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