

The Relationship between the Level of Adherence to Antiretroviral Drugs (ARVs) Use to Viral Load Levels in Outpatient HIV Patients

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ABSTRACT

Human Immunodeficiency Virus (HIV) is a disease that is contagious to humans so that it can lower the immune system and be susceptible to diseases. Drugs given to treat HIV infection and improve the quality of life of People With HIV/AIDS (ODHA) are antiretrovirals (ARVs). Adherence to taking antiretrovirals is an important factor in the success of therapy and reducing the amount of HIV virus in the body of ODHA, so that a high level of adherence has a fairly good or undetectable viral load result. The purpose of this study is to find out if there is a relationship between compliance with viral load levels. The research method was conducted with a cross sectional design, starting from May to June 2024. The data used are the results of the MMAS-8 questionnaire that has been validated and filled out directly at the Putri Ayu Health Center in Jambi City and the results of the viral load level laboratory. Sampling with consecutive sampling. The data obtained in the analysis by bivariate analysis used the Cramer's V with a degree of significance of p-value <0.05. The results in this study were obtained by 11 (52.4%) respondents with a high level of compliance so that the results of viral load were not detected, there were 10 respondents with a moderate and low level of compliance so that 8 (38.1%) respondents had a detected viral load result and 2 respondents were not detected. There was a significant relationship with adherence to taking antiretroviral drugs to viral load levels with a result of 0.000 p-value <0.05 or 5%.

Keywords: compliance with taking medication; antiretroviral; HIV; viral load

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INTRODUCTION

Human Immunodeficiency Virus, hereinafter abbreviated as HIV, is a virus that attacks the immune system which can cause *Acquired Immuno-Deficiency Syndrome*. *Acquired ImmunoDeficiency Syndrome*, hereinafter abbreviated as AIDS, is a set of symptoms and signs of infection related to a decrease in the immune system acquired due to HIV infection (Ministry of Health of the Republic of Indonesia, 2022).

HIV cases today continue to be a world health problem and continue to increase year by year. According to UNAIDS/WHO estimates (2023) data, globally there were 31.5 million (26.7–36.8 million) people living with HIV in 2010, 38.7 million (32.8–45.2 million) in 2021, and 39 million (33.1–45.7 million) in 2022. HIV/AIDS is an infectious disease that has become a public health problem in Indonesia. According to data from the Directorate General of Prevention and Control of Infectious Diseases (2020), it is estimated that there are 543,100 people in Indonesia who are infected with HIV/AIDS. A total of 30,137 people died from AIDS in the same year. Of the number of People With HIV/AIDS (ODHA) in Indonesia, as many as 149,883 people have received antiretroviral treatment (ARV).

In Jambi Province, based on data from the Jambi Provincial Health Profile in 2020, there were 169 cases of HIV and 32 cases of AIDS. HIV and AIDS cases are spread across all districts/cities in Jambi Province. Jambi City is the Regency/City with the highest number of

cases, namely 122 cases of HIV and 28 cases of AIDS. According to the Association (R. Kusuma, 2023) of *Risilent and Sustainable System Health for Health AIDS Tuberculosis Malaria* (RSSH ATM) Jambi Province (2023), in 2023 there will be 126 cases of HIV and 25 cases of AIDS in Jambi City. Putri Ayu Jambi Health Center is a health facility that has access to health facilities and workers according to the standards set in HIV/AIDS services. In 2023 there will be 99 HIV patients and in 2024 there will be an increase to 117 HIV patients covering adults to the elderly. The large number of HIV/AIDS patients at the Putri Ayu Health Center in Jambi City is not all compliant in taking ARV drugs regularly.

This research has novelty in the following aspects. First, this study focuses on the compliance of HIV/AIDS patients in taking ARVs, different from previous studies that more discuss the epidemiological aspects of HIV/AIDS. Second, this study explores internal and external factors that affect patient compliance in undergoing ARV therapy, including family support, social stigma, and affordability of health services. Third, this study offers evidence-based strategy recommendations to improve patient adherence to ARV treatment, which has not been widely explored in previous studies in Jambi Province.

This study aims to analyze the level of compliance of HIV/AIDS patients at the Putri Ayu Health Center in Jambi City in taking ARVs, identify factors that affect patient compliance, both from medical, social, economic, and psychological aspects, and provide recommendations for effective strategies to increase compliance with ARV treatment to reduce HIV/AIDS morbidity and mortality rates. This research is expected to provide benefits in various aspects. From an academic perspective, this study can be a scientific reference related to ARV therapy compliance and the factors that affect it, especially in Indonesia. From a practical perspective, this study can provide insights for health workers and local governments in designing strategies to increase HIV/AIDS patient compliance with ARV treatment. From a social perspective, this study aims to increase public awareness of the importance of ARV therapy compliance and reduce stigma against ODHA, thereby creating a more inclusive and supportive environment for HIV/AIDS patients. With this research, it is hoped that effective solutions can be found to improve ARV treatment compliance, which ultimately contributes to improving the quality of life of ODHA and controlling the HIV/AIDS epidemic in Jambi City and surrounding areas.

METHOD

This study uses a *cross sectional* design method, one of the methods carried out is that the patient fills out the *MMAS-8 questionnaire* which has been validated and filled out directly at the Putri Ayu Health Center in Jambi City with the assistance of the person in charge of the HIV program. Before filling out the questionnaire, the researcher provided directions on how to fill out the questionnaire for HIV patients who received treatment in May-June 2024 to the person in charge of the HIV program. And data on laboratory results of *viral load levels* of HIV patients at the Putri Ayu Health Center, Jambi City.

Data Processing and Analysis

The data processing in this study can be calculated using the compliance measurement method, namely if the respondents answered questions number 1-4 and 6-7 answered "yes" then the score given is 0 and if they answer "no" then the score given is 1. Question no. 5 is answered "yes" then the score given is 1 and if answered "no" then the score given is 0 and question no. 8 if the respondent answers A=1, B=0.75, C=0.5, D=0.25, and E=0.

Table 1. Compliance Level Category

Scale	Score
8	High Compliance
<8 (6-7,99)	Medium Compliance
<6 (0-5.99)	Low Compliance

The variable data in this study was analyzed by the following method:

1. Univariate Analysis

Univariate analysis was carried out to describe the characteristics of the variables (gender, age, length of time suffering from HIV and antiretroviral drugs) in the form of distribution, percentage and frequency of each variable.

2. Bivariate Analysis

Bivariate analysis was carried out by the *Cramer's V test* with the application of the *Statistical Program for Social Science (SPSS)* version 25 which was used to determine whether or not there was a relationship between adherence to taking ARV drugs to *viral load levels* in HIV patients. The conditions for using the *Cramer's V test* with a significance value (Sig.), where if the value of Sig. <0.05 means that there is a relationship between compliance with *viral load levels* (H1), and if the value of Sig. >0.05 means that there is no relationship between compliance with *viral load levels* (H0).

RESULTS AND DISCUSSION

Univariate Analysis

1. Patient Compliance Level in the Use of Antiretroviral Drugs at the Putri Ayu Health Center, Jambi City Gender

a. Characteristics & Compliance Levels of Respondents

Table 2. Characteristics and Compliance Levels of Respondents

Characteristic	Compliance Level			Total	(%)
	High Compliance	Medium Compliance	Low Compliance		
Gender (n=21)					
Man	8	2	6	16	76,2
Woman	3	0	2	5	23,8
Age (n = 21)					
Adolescent (12-25 years)	3	2	2	7	33,3
Adult (26-45 years old)	8	0	5	13	62
Elderly	0	0	1	1	4,7

(46-65 years old)					
Long time with HIV (n = 21)					
< 1 Year	2	0	1	3	14,3
1-3 Years	6	2	4	12	57,1
4-6 Years	3	0	0	3	14,3
7-9 Years	0	0	1	1	4,7
10-12 Years	0	0	1	1	4,7
13-15 Years	0	0	0	0	0
16-18 Years	0	0	0	0	0
19-21 Years	0	0	1	1	4,7

Source: Research Data Processing, 2024

Based on table 2. Above there were 21 respondents with the majority being male, 16 respondents (76.2%), the majority of adults (26-45 years old), 13 respondents (62%), the majority of long-term HIV sufferers (1-3 years), 12 respondents (57.1%), and the respondent's compliance level was high.

b. Types of Antiretroviral Drugs

Table 3. Types of Antiretroviral Drugs

Drug Name & Dosage of the preparation	Frequency (n)	(%)
TLD		
Tenofovir 300mg	13	62
Lamivudin 300mg		
Dolutegravir 50mg		
TLE		
Tenofovir 300mg	7	33,3
Lamivudin 300mg		
Efavirenz 600mg		
Duviral		
Lamivudine 150mg	1	4,7
Zidovudine 300mg		
Neviral		
Nevirapine 200mg		
Total	21	100

Source: Research Data Processing, 2024

Based on Table 3, 13 respondents (62%) were using ARV TLD drugs as their primary treatment. This indicates that TLD-based regimens are widely adopted due to their high efficacy and minimal side effects. The preference for TLD also reflects government support and alignment with global HIV treatment guidelines.

Results of HIV Patients' Viral Load Levels at the Putri Ayu Health Center, Jambi City

Table 4. Results of HIV Patients' Viral Load Levels

Results of Viral Load Levels (Coffee/ml)	Frequency (n)	Percentage (%)
Undetected (< 40 copies/ml)	13	62
Detected (> 40 copies/ml)	8	38
Total	21	100

Source: Research Data Processing, 2024

Based on table 4. above, it shows more respondents whose viral load levels are not detected.

Bivariate-Relationship Analysis of Compliance Level to Viral Load Levels

Table 5. Relationship of Level of Adherence to Levels Viral Load

		Cramer's V Test			Information
		Results of Viral Load Levels		Total	
		Undetected	Detected		
Compliance Level	High Compliance	11	0	11	H0
	Medium Compliance	1	1	2	Rejected H1
	Low Compliance	1	7	8	Accepted
Total		13	8	21	

Source: Research Data Processing, 2024

Based on table 5. above in the *Cramer's V test*, a *p* value of 0.001 ($p < 0.05$) was obtained, meaning that there was a significant relationship with adherence to taking antiretroviral drugs to viral load levels.

Discussion

1. Compliance Level of Antiretroviral Drug Use at Putri Ayu Health Center

Human Immunodeficiency Virus or often called HIV is a disease that is contagious to humans so that it can lower the immune system and be susceptible to disease (Suryanto et al., 2021). Adherence is taking medication on time, in the right dose, never forgetting and never quitting. Adherence to taking antiretrovirals is the most important factor in success and reducing the amount of HIV virus in the patient's body. Emphasis on the number has the goal of maintaining the body's immune system. Thus, people with HIV will

get a good quality of life Measurement of the level of compliance with the use of antiretroviral drugs at the Putri Ayu Health Center in Jambi City using a validated (Karyadi, 2017). *MMAS-8 questionnaire*. In this case, the researcher did not immediately meet with HIV patients who were treated at the Putri Ayu Health Center in Jambi City to fill out a questionnaire. Before filling out the questionnaire, the researcher provided information related to how to fill out the questionnaire for HIV patients who came for treatment in May-June 2024. Researchers are not allowed to directly meet HIV patients because based on the explanation from the person in charge of the HIV program at the Putri Ayu Health Center, the patient's name and address cannot be given because it maintains the patient's privacy, and should not be published.

2. Gender

According to the high number of men suffering from HIV it is assumed that most men commit risk factors such as deviant and risky sexual intercourse, such as having free sex by changing partners more than one and having sex with the same sex or homosexuals as well as the use of illegal drugs using non-sterile syringes. Homosexual or Male Sex Men (LSL) are the most risky sex to transmit HIV, because the anus is not used for sexual intercourse so it will hurt and facilitate the entry of HIV into the body (Permatasari et al., 2020) (Sidjabat et al., 2016). According to research, women are more likely to contract HIV from their sexual partners alone. If a woman has contracted HIV/AIDS, it is very easy for her to transmit the disease to her child, especially to pregnant and lactating women. Kusuma, (2016)

This explanation is in accordance with the results conducted by researchers at the Putri Ayu Health Center in Jambi City for the 2024 period, namely the most patients suffering from HIV, namely male with 16 patients (76.2%). And in line with the results of the HIV AIDS development report which states that HIV infection occurs most often in the male sex, which is 71% and only 29% for women. Ministry of Health of the Republic of Indonesia, (2022).

3. Age

The age of outpatient HIV patients at the Putri Ayu Health Center in Jambi City in this study is categorized into 3 groups that refer to the age division by the Ministry of Health of the Republic of Indonesia in 2009, namely adolescents 12-25 years old, adults 26-45 years old, and the elderly 46-65 years. Based on the results of the study, the age of HIV patients is the most at the age of 26-45 years, as many as 13 patients (62%). This is also in line with the results of research conducted by and reports on the development of HIV AIDS which states that HIV infection occurs most often at the age of 25-49 years. Anggriani et al., (2020) Ministry of Health of the Republic of Indonesia, (2022)

Where this age group is included in the productive age group that encourages sexual activity and injecting drug users. Age has a very close relationship with the maturity of a person's thinking, where age will affect a person's attitude and behavior in doing something. People with older ages will have different sexual behaviors from adolescence. (Syadzali et al., 2019) (Jaemi et al., 2020)

4. Long Time to Live with HIV

Based on the results of the study, the long-term suffering from HIV at the Putri Ayu Health Center, Jambi City, is for 1-3 years. This result is in line with research that found

that the long time of suffering from HIV for 1 - 3 years is included in stage II, this phase the patient has been infected with HIV positive but has not shown symptoms of illness but can already transmit it to others. While the mild period can last 5-8 years, the development of HIV infection into AIDS is determined by the type of viral virulence, and host factors (immunity). There are three types of HIV Infection, namely: rapid progressors lasting 2-5 years, average progressors lasting 7-15 years, and slow progressors more than 15 years after HIV infection to AIDS. (Kustanti & Pradita, 2017) (Health of the Republic of Indonesia, 2022)

The long time of suffering from HIV can also be attributed to the use of ARVs that he is currently taking. Based on the results of the researchers, there was high adherence with a long time of suffering <1-6 years as many as 11 patients (52.4%), moderate compliance with a long suffering period of 1-3 years as many as 2 patients (9.5%), and low compliance rate with a long suffering <1-21 years as many as 8 patients (38.1%) which means that the longer they suffered, the less compliance they had in taking ARV drugs, the longer they were infected with HIV, hence the more experience is related to the disease . According to the longer a person suffers from HIV, the more their physical and mental condition decreases due to HIV infection, so that people with HIV feel unhappy, bored in treatment, and dissatisfaction with life, where these conditions can reduce the quality of life of patients with HIV/AIDS. (Liyarovitasari & Lestari Puji, 2020) Riyani et al., (2024)

5. Antiretroviral Drugs

Antiretrovirals, abbreviated as ARVs, are drugs given to treat HIV infection as well as reduce the risk of HIV transmission, improve the quality of life of people with HIV, reduce the amount of virus in the blood until it goes undetected, and inhibit the exacerbation of opportunistic infections. Before deciding to start ARV, it is certain that ODHA must have readiness, by ensuring that good compliance is very important from the initial phase of ARV treatment to get long-term therapy success. Therefore, counseling is needed to increase ODHA's knowledge about ARVs, including lifetime use, possible side effects, and possible failures during subsequent therapy. The most widely used ARV therapy regimen at the Putri Ayu Health Center in Jambi City is TLD, which is a combination of tenofovir, lamivudine, and dolutegravir as many as 13 (62%). The results for the distribution of ARV therapy regimens based on medication adherence were high adherence levels, moderate and low adherence were more common in patients receiving TLD therapy regimens. Based on the KDT-TLD (Fixed Dose Combination - Dolutegravir) regimen, it is currently a first-line recommendation for those who are just starting ARVs and can also be a second-line if the previous line of therapy fails. According to TLD, it has 3 ingredients, namely Tenofovir 300mg, Lamivudine 300mg, and Dolutegravir 50mg. (Health of the Republic of Indonesia, 2022) (Ministry of Health of the Republic of Indonesia, 2019) (Cecilia & Widjaja, 2022) (Ministry of Health of the Republic of Indonesia, 2019)

In addition to TLD at the Putri Ayu Health Center in Jambi City, there is also a combination of Tenofovir 300mg, Lamivudine 300mg, and Efavirenz 600mg (TLE) as many as 7 respondents (33.3%) and is available in the form of FDC (Fixed Dose Combination) which is enough to be taken once a day so that it makes it easier for patients

to consume medication and can reduce the occurrence of forgetting to take medicine. The results of this study also showed that the use of ARV FDC can reduce the risk of HIV patients being hospitalized by 31% and increase the chance of undetectable viral load by 21%. Based on the results of the researchers, there was 1 patient (4.7%) who used the old regimen, namely *duviral-neviral*. *Duviral* is a combination of 2 NRTI drugs, namely *Zidovudin (AZT)* and *Lamivudine (3TC)*, while *Nevirapine/Neviral (NVP)* is an NNTI drug group. So if analyzed the combination of ARVs received, namely *duviral* combined with *Neviral (Nevirapine)* or *Efavirenz (EFV)*. Auliannissa et al., (2020) (Idramsyah et al., 2019)

According to the old regimen included drugs with unpleasant side effects for patients because they could make it difficult for patients to consistently adhere to therapy, or require medication replacements. If there is a problem with adherence to taking medication, this therapy will fail to reduce the amount of viral load in the patient's body. ODHA's compliance in consuming antiretroviral drugs makes the quality of life better, the survival life is longer. Putri et al., (2022) (Ikhlasul Amal & Arifin Noor, 2021)

6. Overall Compliance Level

Medication adherence is a key consideration when starting ARV therapy. The results of the study obtained the distribution of the most frequency of compliance with taking ARV at the Putri Ayu Health Center, Jambi City, namely patients with a high level of compliance with taking ARV drugs as many as 11 respondents (52.3%). This result is similar to a study conducted that measured the level of compliance of HIV patients in taking ARV drugs using the MMAS-8 questionnaire, and had a high compliance category result of a number (63.4%). Agus Setiawan Putra, et al (2023)

Compliance with the use of ARV drugs at the Putri Ayu Health Center, Jambi City, based on the results of research on men has a poor level of adherence compared to women who are more compliant in ARV treatment, which is reinforced by the results of research that states that women are more compliant in ARV treatment compared to men because of women's caring attitude when stressed choosing to find friends to socialize. support as well as something that can make them better. Unlike men, they prefer to solve their problems on their own. Debby et al., (2019)

Factors that can affect the level of compliance of HIV patients in ARV treatment include factors from patient awareness, family support and health workers, and side effects of ARV drugs that have an influence on the severity of the disease in HIV patients. According to the optimal viral suppression level research, at least 95% of the drug dose should not be abandoned. The risk of therapy failure arises when patients often forget to take their medications. Before being declared a failure of ARV therapy, the patient underwent counseling and must use ARV for at least 6 months with good adherence. If the compliance is not good or stop taking the medication, the failure assessment is carried out after taking the medication again regularly for at least 3-6 months. (Putri et al., 2022) Auliannissa et al., (2020) (Ministry of Health of the Republic of Indonesia, 2019)

7. Results of Viral Load Levels of HIV Patients at Putri Ayu Health Center

Based on the results of the viral load examination, it is known that most of the patients are undetected, namely 13 patients (62%) and the results of the viral load detected

are 8 patients (38%), the total number of patients who carry out viral load examinations in the 2024 period is 21 HIV patients.

According to research, adherence to HIV treatment has a higher level of undetectable viral load at high or adherence levels compared to low adherence or non-adherence levels that have detectable and poor viral load outcomes. This shows that most patients in high adherence levels have fairly good or undetectable viral load results, while most patients in low adherence levels have detectable or even increased viral load results. Agus Setiawan Putra et al., (2023)

The results of this study are in line with previous studies where patients who adhered to taking ARV drugs had good viral load levels and undetectable results, while non-compliant patients had poor viral load levels and were detected or increased. If the viral load result < 40 copies/ml of the viral load level is said to be undetectable, this result does not mean that there is no virus in the blood but the number of viruses present cannot be found and counted by the test. Early administration of ARVs can reduce HIV risk transmission by 93% in non-HIV sexual partners (serodiscordant couples). Suppression of viral load levels using ARVs is proven to be related to low concentrations of virus in genital secretions, and prevention efforts using ARVs are part of (Wirna Sari & Farida Noor Irfani, 2024) *treatment as prevention* (TasP). (Ministry of Health of the Republic of Indonesia, 2019)

8. The Relationship between the Level of Compliance with the Use of Antiretroviral Drugs on Viral Load Levels

Based on the results of the study, patients with a high level of adherence resulted in undetectable viral load levels of 11 patients (52.4%), medium adherence levels resulted in detectable viral load levels of 1 patient (4.7%) and 1 patient (4.7%) undetected, then low adherence levels resulted in detectable viral load levels of 7 respondents (33%) and 1 respondent (4.7%) undetectable viral load levels. Bivariate analysis of this study identified a significant relationship between adherence to taking ARV drugs and viral load levels in HIV patients. The results of the study showed the result of p value=0.001 ($p < 0.05$). This is also supported by previous research there is a correlation between adherence to taking antiretroviral drugs and viral load levels in HIV patients at Tugurejo Hospital Semarang. Putri et al., (2022)

The results of this study are also supported by a significant relationship between medication adherence to viral load levels. Where the results of this study show that the level of good viral load is not detected (decreased) with compliance with taking compliant drugs, while the level of bad viral load is detected (increased) with compliance with taking non-compliant drugs. According to ODHA, those who do not comply with taking ARV drugs will experience resistance and will get an increased viral load. Resistance is when the HIV virus is in the body will become immune to commonly used ARV drugs. This can happen when the virus undergoes mutations or genetic changes so that the drug is no longer effective. Hamzah et al., (2020) (Bachrun, 2017)

CONCLUSION

Based on the results of this study, it can be concluded that the level of compliance with the use of antiretroviral drugs in HIV patients at the Putri Ayu Health Center in Jambi City is relatively high. Good adherence to antiretroviral consumption has a positive impact on the control of HIV infection, which is reflected in the results of the patient's viral load levels. From the data obtained, as many as 13 patients showed undetected viral load results, while 8 patients still had detectable viral load levels. These results indicate that the level of adherence to treatment has an important role in reducing the amount of virus in the body of people with HIV. In addition, statistical analysis showed a significant relationship between adherence to antiretroviral drugs and viral load levels, as shown by the p -value < 0.05 . This means that the higher the patient's compliance with antiretroviral medications, the more likely it is that the viral load in his or her body will go undetected, contributing to improved quality of life as well as a reduced risk of transmission. Therefore, these findings emphasize the importance of education and mentoring for HIV patients in improving adherence to antiretroviral therapy in order to achieve optimal treatment effectiveness. The results of this study can also be the basis for medical personnel and policy makers in designing more effective intervention strategies to improve patient compliance, both through continuous education and adequate social support.

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