

# Analysis of Viral Load Factors in HIV/AIDS Patients in Men in Kendari City Hospital

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## ABSTRACT

Human Immunodeficiency Virus (HIV) is a retrovirus that attacks the body's immune system. Compliance with taking antiretroviral medication is a must in reducing the number of viruses in the blood. The success of antiretroviral treatment can be determined by monitoring therapy, namely by testing the viral load. In the community of Men Who Have Sex with Men (MSM) in Kendari City who are infected with HIV, there are still many who do not comply with taking antiretroviral drugs themselves. This research is intended to analyze factors related to the viral load of HIV/AIDS patients in men and women at the Kendari City Regional Hospital. The research design used was observational analytic with a cross-sectional study approach. The population in this study were all HIV/AIDS sufferers who were undergoing ARV treatment at Kendari City Hospital in the MSM category group, namely 371 people, while the sample was 79 people taken using simple random sampling techniques. The variables studied in this study were adherence to antiretroviral medication, clinical stage, and viral load levels of HIV/AIDS patients. Antiretroviral medication adherence variables were measured using the Morisky Medication Adherence Scale 8 questionnaire. Clinical stage variables, and viral load levels were measured based on the doctor's medical records. The research data was then processed and analyzed using the chi-square test and logistic regression, with the help of the SPSS version 25.0 application. The results of the study showed that the variables were adherence to taking medication (p-value = 0.000), and clinical stage (p-value = 0.003), it was

concluded that adherence to taking medication, and clinical stage were related to the level of HIV/AIDS patient load in promiscuous men at the Kendari City Regional Hospital.

**Keywords:** HIV, Men Like Men, Viral Load, Medication Adherence

## INTRODUCTION

HIV (Human Immunodeficiency Virus) is a virus that can reduce the immune system in the human body by infecting and destroying CD4 cells <sup>[1,2]</sup>. The spread of HIV tends to be rapid and widespread. HIV transmission can occur through direct contact with bodily fluids from an infected person, such as blood, breast milk, semen, and vaginal fluids <sup>[3]</sup>. WHO (World Health Organization) states that as many as 37.9 million people are living with HIV <sup>[4]</sup>.

HIV cases continue to increase every year. In 2021, for the July – September period, there were (69.4%) cases in the 25–49-year age group, followed by the 20-24 year age group (18%), and the ≥ 50 year age group (7.2%). Based on gender, the percentage of people with HIV AIDS (PLWHA) is (73%) for men and (27%) for women with a male-to-female ratio of 2:1. Based on risk factors, HIV in homosexuals (34.2%), heterosexuals (12.8%), and sharing needles (0.5%). The percentage of PLWHA reported in the FSW population group was 2.9%; MSM 32.7%; transgender 1.5%; IDU 0.5%; WBP 1.2%; pregnant women

16.4%; TB patients 11.1%; and STI patients 0.9% [5].

Southeast Sulawesi Province ranks 29th out of 34 provinces in Indonesia with a cumulative number of HIV cases from 2005 to 2020 of 1,192 people. Meanwhile, the cumulative number of AIDS cases is 638 people. The number of new HIV/AIDS cases in the last 3 years respectively was 314 cases in 2019, 319 cases in 2020, and 445 cases in 2021. The distribution of HIV/AIDS cases in Southeast Sulawesi was found to be mostly in Kendari City and Bau City. Specifically for Kendari City, there were 134 cases in 2020, 155 cases in 2021, and 224 cases in 2022, where treatment for HIV/AIDS sufferers in Kendari City was spread across three health facilities, namely Bahteramas RSU, Kendari City Regional Hospital and Lepo-lepo Community Health Center [6].

Men who have sex with men (MSM) are one of the key and high-risk groups which is still a problem in the world, including in Indonesia. Some key populations (IDUs, sex workers and waria) show that new HIV infections in the population aged 15 years and over have consistently decreased over time, but this is not the case in the population of men who have sex with men (MSM) and low-risk women (partners key population). In these two groups, the rate of new HIV infections actually increased [7,8].

The number of HIV/AIDS cases for risk factors for men having sex with men (MSM) in Tersu City Hospital has increased by 63.20% in 2022. At the beginning of the opening of the PDP (Support Treatment and Care) service in 2016 there were 6 cases of HIV in MSM (60.00%), in 2017 there were 16 cases (53.33%), in 2018 there were 35 cases (54.69%), in 2019 there were 36 cases (48.00%), in 2020 there were 53 cases (59.55%). %, in 2021 there were 89 cases (65.44%), and in 2022 there were 136 cases (74.32%). Meanwhile, the total number of MSM cases was 371 cases (63.20%).

Treatment for people infected with HIV is given antiretrovirals (ARV). The aim of antiretroviral treatment is to reduce the

proliferation (replication) of the HIV virus, increase the number of CD4 cells and slow the progression of the disease. Factors that support the success of antiretroviral therapy are compliance, clinical stage, and opportunistic infections [9,10].

Adherence to antiretroviral therapy is mandatory for HIV-infected patients. Adherence describes the use of antiretroviral therapy which must always be monitored and evaluated regularly and provided support by family or those closest to you. Medication non-adherence can lead to low virological failure of first-line treatment regimens and the spread of drug-resistant forms of the virus, resulting in opportunistic infections [11,12].

The success of antiretroviral treatment can be determined by monitoring therapy, namely by testing the viral load. Viral load is the amount of virus in the blood of HIV sufferers. The higher the viral load, the faster HIV disease progresses. A study conducted in a large cohort of HIV-infected individuals found that viral load was the single best predictor that could independently predict clinical outcome and record after starting antiretroviral drug therapy. Plasma viral load levels show a decline within four to six weeks after therapy is initiated [13,14].

The use of ARVs (antiretrovirals) in patients with positive HIV test results is an effort to extend the life expectancy of HIV-AIDS sufferers, known as PLWHA (people with HIV-AIDS). ARVs work against infection by slowing the reproduction of HIV in the body. Generally, ARVs are effectively used in combination, not to cure, but to prolong the lives of PLWHA, make them healthier and more productive, cause viral load values to become undetectable, and suppress the occurrence of opportunistic infections [15,16].

Based on the background above, the author is interested in conducting research with the title Analysis of the Relationship between Adherence to Taking Antiretroviral Drugs, Clinical Stage, and Opportunistic Infections with the Viral Load of HIV/AIDS Patients

among men with sex (MSM) in Kendari City regional general hospitals.

### MATERIALS & METHODS

This research is an observational analytic with a cross-sectional approach, namely research intended to find the relationship between one variable and another variable by collecting data (measurement) of independent and dependent variables carried out once at the same time. The research was carried out at the Kendari City Hospital from November to December 2023.

The population in this study were all HIV/AIDS sufferers who were undergoing ARV treatment at the Kendari City Regional Hospital in the MSM category group, namely 371 people, while the sample was 79 people taken using simple random sampling techniques. The sample inclusion criteria include age > 18 years and having been on ARV therapy for more than 6 months, while the exclusion criteria are patients with an introverted personality.

The variables studied in this study were adherence to antiretroviral medication, clinical stage and opportunistic infections, and viral load levels in HIV/AIDS patients. Antiretroviral medication adherence variables were measured using the Morisky Medication Adherence Scale 8 questionnaire. Clinical stage variables, opportunistic infections, and viral load levels were measured based on the doctor's medical records. The research data was then processed and analyzed using the chi-square test and logistic regression, with the help of the SPSS version 25.0 application

## RESULT

Table 1. Characteristics of Research Respondents

Characteristics	n	%
<b>Age (year)</b>		
20 – 24 year	15	18,9
25 – 49 year	57	72,2
≥ 50 year	7	8,9
<b>Education level</b>		
elementary school	7	8,9
Junior high school	11	13,9
Senior High School	34	43,0
College	27	34,2
<b>Job</b>		
Student	5	6,3
Self-employed	18	22,8
Honorary	4	5,1
Private sector employee	44	55,7
Government employees	8	10,1

Table 1 shows that the dominant respondents were aged 57 (72.2%), predominantly had a high school education of 34 (43%) and worked as private employees as many as 44 (55.7%).

Table 2. Distribution of Research Variables

Variable	n	%
<b>Medication Adherence</b>		
Not obey	24	30,4
Obey	55	69,6
<b>Clinical Stage</b>		
AIDS (Stage 3-4)	23	29,1
HIV (Stage 1-2)	56	70,9
<b>Viral Load Levels</b>		
Detected	20	25,3
Not detected	59	74,7

Table 2 shows that the dominant number of respondents who adhere to taking medication is 55 (69.6%) the dominant number of HIV sufferers (Stage 1-2) is 56 (70.9%), the dominant viral load level is 59 (74.7%).

Table 3. Cross-Sectional Test Results Regarding Viral Load Levels of HIV/AIDS Patients in Men

Variable	Viral Load Levels				p
	Detected		Not detected		
	n	%	n	%	
Medication Adherence					
Not obey	15	62.5	9	37.5	0.000
obey	5	9.1	50	90.0	
Clinical Stage					
AIDS (Stage 3-4)	11	47.8	12	52.2	0.003
HIV (Stage 1-2)	9	16.1	47	83.9	

Table 3 shows that the variables of medication adherence and stage of infection

have a significant relationship with the viral load levels of HIV patients.

**Table 4. Probability Value (p) of Candidate Selection Results for Multivariate Modeling**

Independent Variable	p
Compliance with taking medication	0.000*
Clinical stage	0.090*

Description: \*Meets the requirements to enter the multivariate test

Table 4 shows that both variables meet the requirements to be included in further analysis.

**Table 5. Results of Multiple Logistic Regression Analysis**

Variable	OR	95% CI		p
		Lower	Upper	
Medication Adherence	16,667	4,842	57,372	0,000
Clinical Stage	4,787	1,617	14,171	0,003
N Observation	79			
-2 Log Likelihood	57,900			
Nagelkerke R Square	48,5%			

Sequentially, the factors that most influence the Viral Load Levels of HIV/AIDS Patients among Men Who Have Sex with Men (MSM) in Regional Hospitals are medication adherence (OR = 16,667), clinical stage (OR = 4,787).

## DISCUSSION

The next cause of non-compliance with a percentage of 18% was due to forgetting to take ARV medication in the last 2 weeks, mostly in this condition because no one reminded and supported them in taking the ARV medication itself. Non-compliance among PLWHA who do not have a Medication Companion (PMO) is twice as large as PLWHA who have a Medication Companion (PMO). The role of the PMO is very large because it is tasked with reminding PLWHA to regularly take ARVs at the clinic and take ARVs regularly, so that PLWHA continue to follow ARV therapy [17,18].

The results of the bivariate analysis showed that there was a relationship between adherence to taking antiretroviral medication and the viral load levels of HIV/AIDS patients among men who have sex with men (MSM) at the Kendari City Regional Hospital and it was statistically significant (p = 0.000). The results of the multivariate analysis also provided similar results where respondents with a level of

adherence to antiretroviral medication in the adherent category of 16.7 times had undetectable viral load levels. The variable of adherence to taking antiretroviral medication is the variable that most dominantly influences viral load levels compared to the variables of opportunistic infections and clinical stage.

Although this study provides evidence of a relationship between adherence to taking ARV medication and viral load levels, in this study it was also found that from 24 respondents, non-compliance with taking medication with undetectable viral load levels was 9 respondents with a percentage of (37.5%), while Of the 55 respondents who were compliant in taking medication with detectable viral load levels, there were 5 respondents with a percentage of (9.1%), the research findings showed that there were respondents who were compliant in taking medication who were not compliant but their viral load levels were undetectable. This is because respondents feel that the impact of HIV treatment often has unpleasant side effects such as nausea, diarrhea or fatigue which can interfere with daily life so that respondents stop or are inconsistent in taking medication because of these side effects, in addition to the HIV treatment regimen. Often involves taking several types of medication at the right time. This complexity makes it difficult for respondents to comply with the set schedule so that the role of service officers and accompanying officers from NGOs is very necessary in carrying out control when taking ARVs using a medication control book. Support from family, friends, or support groups is very important to help respondents remain compliant in taking medication. If respondents feel unsupported, this can affect their level of compliance.

Respondents who were non-compliant but had undetectable viral load levels were because each respondent's immune response was different from each other, the increase in CD4 could be very fast, very slow or something in between. Respondents whose initial ARV CD4 treatment was very low

(less than 200) accompanied by high viral load levels, the increase in CD4 will be slow, depending on how weak their CD4 was at the start of therapy and it took a long time to increase. Meanwhile, other respondents may not need a long time for an increase in CD4. The respondent's health condition and immunity are indicators in determining whether the respondent's viral load is detected or not.

There were also respondents who were compliant in taking medication but their viral load levels were detected, this was due to inappropriate use of ARV drugs, how and when respondents used anti-HIV drugs and respondents had used other drugs including prescriptions, over-the-counter drugs, herbals, even narcotics. the same time as taking ARV medication. Using medication irregularly, or interactions with other medications can cause the level of anti-HIV medication in the body to be too low to work effectively. PLHIV with the above problems are advised to have a blood test to see the level of anti-HIV drugs in the blood and to see whether HIV in the body has developed resistance to any drugs. HIV in the blood becomes resistant, not only to anti-HIV drugs that have been used, but also to other similar anti-HIV drugs, the role of the clinician is needed to change anti-HIV drugs or to find a suitable combination to consume

The results of the univariate analysis showed that 56 respondents (70.9%) fell into the stage 1-2 (HIV) category, more than those who fell into the stage 3-4 (AIDS) category, namely 23 respondents (29.1% ). This is because of the condition of the respondent when he first came to the RSUD service. Kendari City still has not shown early clinical symptoms of HIV/AIDS, apart from that the respondent underwent ARV therapy from the start of treatment until more than six months by paying attention to compliance in taking ARVs so that the respondent's condition remained in the HIV stage. Apart from that, the awareness of respondents who were assisted by NGOs, NGOs carried out

outreach and intervention assistance in the Kendari City area both face to face and through social media, carried out psychological approaches and support so that new cases were found more quickly so that the respondents' condition remained at the clinical stage of HIV.

The results of bivariate analysis showed that there was a relationship between clinical stage and viral load levels in HIV/AIDS patients among men who have sex with men (MSM) at the Kendari City Regional Hospital and it was statistically significant ( $p = 0.003$ ). The results of the multivariate analysis also provided similar results where respondents with an HIV clinical stage of 4.8 times had undetectable viral load levels. It is assumed that respondents can maintain their immune system in quality and quantity through consultation and communication with health workers regarding adherence to ARV therapy and regimens, daily ARV schedules, ARV storage, and even time reminders by using alarms when taking ARVs, respondents also communicate barriers and side effects of ARVs and how to deal with them, as well as telling health workers when respondents need social support from family and the environment. The explanation above is an effort made by the respondent together with health workers to maintain the respondent's immune system so that the viral load level becomes undetectable and the respondent remains in the HIV stage.

The results of this study are in line with research conducted by LeMessurier et al <sup>[19]</sup> showing that there is a relationship between clinical stage and viral suppression in the body of HIV patients (suppressed viral load). Patients with clinical stages 1 and 2 have very low viral load levels with a fairly good level of treatment compliance. The level of viral suppression in patients who undertake treatment with high adherence in the early clinical stages can be achieved to control the risk of HIV transmission <sup>[20]</sup>.

HIV clinical stages refer to the stages of development of HIV infection in a person's body. In the early stages of HIV infection (stages 1 and 2), the viral load is usually high because the HIV virus reproduces rapidly in the body. During this stage, CD4 levels are still relatively high or viral load levels are low or even undetectable and symptoms may not be very obvious. During disease progression (stages 3 and 4), without appropriate treatment, the viral load may remain high or fluctuate, while the CD4 cell count will tend to decrease. At this stage, the risk of developing opportunistic infections increases due to a weakened immune system [21–23].

## CONCLUSION

Viral load levels in HIV/AIDS patients among men who have sex with men (MSM) are significantly related to medication adherence and clinical stage.

### *Declaration by Authors*

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