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THE NUMBER OF CD4+ T CELLS ON HIV/AIDS PATIENTS WHO HAVE RECEIVED ARV THERAPY

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ABSTRAK

Human immunodeficiency virus (HIV) is an infection that attacks the body's immune system, specifically the white blood cells called Lymphocytes $CD4^+$ T cells. Antiretroviral therapy is the main treatment used in the management of HIV / AIDS. Antiretroviral therapy proved able to suppress viral replication and increase the number of CD4 T-cells so as to suppress the progression of the disease. $CD4^+$ T cell counts is an important indicator to determining the level of immunity of the human body, maintaining the number of $CD4^+$ T cells in normal limits to defend themselves from complications related to HIV/AIDS in particular to prevent opportunistic infections. The number of $CD4^+$ T cells will determine when people living with HIV should begin antiretroviral therapy. To determine the immune status and disease progression in a person infected with HIV, a CD4+ T cell count is performed. Without antiretroviral (ARV) therapy, most people living with HIV/AIDS (PLWHA) will become progressively immunodeficient, which is characterized by a decrease in the number of CD4+ T cells, then progresses to AIDS and can end in death. The purpose of this study was to describe the number of CD4+ T cells in HIV/AIDS patients who had received ARV therapy at Prof. Hospital. Dr. W.Z. Johannes Kupang. Descriptive observational analysed data from medical record of HIV/AIDS patients with antiretroviral therapy. A Total 100 patients who were eligible included in the study had both a CD4 lymphocyte $CD4^+$ T cell count during 2020-2021. The average difference before and after therapy using Test with p-value 0.000 (p-value <0.05) indicates that there is a significant difference between the number of Lymphocytes CD4+ T cells counts before and after therapy.

Keywords: arv theraphy; hiv/aids; lymphocytes cd4+ t cells

INTRODUCTION

Human immunodeficiency virus (HIV) is an infection that attacks the body's immune system, specifically the white blood cells called Lymphocytes $CD4^+$ T cells. HIV destroys these Lymphocytes $CD4^+$ T cells, weakening a person's immunity against opportunistic infections, such as tuberculosis and fungal infections, severe bacterial infections and some cancers. It is spread by contact with certain body fluids of a person with HIV, most commonly during unprotected, through sharing injection drug equipment (The White House, 2021).

HIV infection can be diagnosed using simple and affordable rapid diagnostic tests, as well as self-tests. It is important that HIV testing services follow the 5Cs: consent, confidentiality, counselling, correct results and connection with treatment and other services. People diagnosed with HIV should be offered and linked to antiretroviral treatment (ART) as soon as possible following diagnosis and periodically monitored using clinical and laboratory parameters, including the test to measure virus in the blood (viral load). If ART is taken consistently, this treatment also prevents HIV transmission to others. At diagnosis or soon after starting ART, a Lymphocytes $CD4^+$ T cells count should be checked to assess a person's immune status. The Lymphocytes $CD4^+$ T cells count is a blood test used to assess progression of HIV disease, including risk for developing opportunistic infections and guides the use of preventive treatment. The normal range of Lymphocytes $CD4^+$ T cells count is from 500 to 1500 cells/mm^3 of blood, and it progressively decreases over time in persons who are not receiving or not

responding well to ART. If the person's Lymphocytes $CD4^+$ T cells count falls below 200, their immunity is severely compromised, leaving them susceptible to infections and death. Someone with a CD4 count below 200 is described as having an advanced HIV disease (WHO. 2022).

Based on Data by Director General of Disease Control and Prevention (P3 Kemenkes in 2021, the total number of PLWHA (People Living With HIV/AIDS) found during the January – March 2021 period was 7,650 people and 88.39% had received ARV treatment. most of them are in the age group of 25 - 49 years (71.3%) and male (69%). Based on risk factors, 27.2% of homosexuals, man love man (26.3%) and transgender (0.9%) (Kemenkes, 2021).

East Nusa Tenggara Province ranks seventeenth in the number of cases of HIV/AIDS in Indonesia. Based Data on HIV/AIDS cases in the Province of NTT compiled by the Health Office of the Province of NTT from 1997 to March 2021 contained 7662 cases spread across 22 districts/cities with 1443 people dying. Data from the Secretariat of the AIDS Commission (KPA) NTT, The number of HIV/AIDS cases in NTT from January to July 2021 was 259 cases.The most cases in Kota Kupang are 72 cases. The second highest number of cases was in Belu Regency, namely 33 cases and the third highest number of cases was in Sikka Regency, namely 18 cases and 16 cases respectively in East Sumba Regency and Manggarai Regency (KPA NTT, 2021).

Antiretroviral therapy is the main therapy used in the management of HIV/AIDS. Antiretroviral therapy has been shown to suppress viral replication and increase the number of Lymphocytes $CD4^+$ T cells so as to suppress disease progression. Immunological and virological monitoring is needed to monitor the use of antiretrovirals and see the success achieved by antiretroviral therapy itself. The number of Lymphocytes $CD4^+$ T cells is an important indicator in determining the level of human immunity, maintaining the number of Lymphocytes $CD4^+$ T cells within normal limits in the range of 500-1000 cells/mm^3 of blood, being able to defend themselves from complications related to HIV/AIDS, especially preventing HIV/AIDS. opportunistic infection. The number of Lymphocytes $CD4^+$ T cells will determine when PLWHA should start ARV therapy. The higher the number of Lymphocytes $CD4^+$ T cells, the better our immune system. On the other hand, the lower the number of CD4+ T cells, the lower our immune system. ARV therapy is given at Lymphocytes $CD4^+$ T cells count of 350 cells/mm^3 because at that number the body begins to be susceptible to opportunistic infections. The hope of ARV therapy is to increase the number of Lymphocytes $CD4^+$ T cells as high as possible. This means increased endurance and quality of life of PLWHA. Examination of Lymphocytes $CD4^+$ T cells counts is recommended every 3-6 months with the aim of monitoring the impact of therapy. The increase in the number of Lymphocytes $CD4^+$ T cells will logically be followed by a decrease in the number of the HIV virus. On the other hand, when Lymphocytes $CD4^+$ T cells decrease, the viral load increases (Langford et al., 2007).

Various studies have suggested the increase in $CD4^+$ T cells as the body's response to ARV therapy depends on the amount of viral load and $CD4^+$ early. Patients with $CD4^+$ T cells high at the start of antiretroviral treatment had an increased number of $CD4^+$ T cells response was good. Studies conducted *Viard et al.* said the higher number of $CD4^+$ T cells PLWHA when starting ARV therapy the higher increase in the number of $CD4^+$ T cells which they were acquired, it is in line with research by *Boris et al*. which states patients initiating therapy with a number of $CD4^+$ T cells <50 cells/mm^3 are four times does not reach $CD4^+$ T cells >200 cells/mm^3 and were twice did not reach $CD4^+$ T cells >500 cells/mm^3 compared with patients who started treatment with $CD4^+$ T cells > 50 cells/mm^3. *Garcia et al.* also states that patients who started antiretroviral therapy with $CD4^+$ T cells <500 cell /mm^3 $CD4^+$ T cells increases

faster than the group it began therapy at <200 cells/mm^3. Another study conducted by *Gandhi et al.* states that the characteristics of the factors affecting the increase in CD4$^+$ T cells where patients initiating antiretroviral therapy at a younger age had increased CD4$^+$ T cells higher than the older. It was also reported that gender affects the increase in CD4$^+$ T cells, women have an increased CD4$^+$ T cells higher than men. But there are also other studies that reported no relationship between age and weight at the start of therapy with an increase in CD4$^+$ T cells, gender and risk factors of HIV infection at the time of initiation of therapy with an increase in CD4$^+$ T cells ()

METHOD

Descriptive observational analysed data from medical record of HIV/AIDS patients with antiretroviral therapy. The determination of this sample using a total sampling, which all patients are flawed in the register at a certain time and meet the inclusion and exclusion criteria specified. Inclusion criteria include patients with HIV infection who first conduct ARV therapy in January 2020- December 20121 at Prof. Dr. W.Z. Johannes Kupang hospital, and provided the results of Lymphocyt CD4$^+$ T cell counts after getting ARV therapy. Exclusion criteria included patients in the early treatment had a CD4$^+$ T cell counts >350 cells/mm^3 and pregnant women.

RESULT

A Total 100 patients who were eligible included in the study had both a CD4 lymphocyte CD4$^+$ T cell counts during 2020-2021. These patients are described in Table 1. of 127 subjects are largely male sex (64%) than women (36%) and Mostly ages >40 years (42%). Subject largely have middle education (SMP/SMA) (64%), mostly working as a enterprenauer(45%). At the start of Antiretroviral therapy, most of the subjects had a Lymphocytes CD4$^+$ T cells counts <200 cells /mm^3 (70%). After therapy mostly HIV/AIDSpatienst had a Lymphocytes CD4$^+$ T cells counts increasing 201 - 350 Sel/mm^3 (40%)

Table 1.
Respondent characteristics of HIV/AIDS Patiens with antiretroviral theraphy(n= 100)

Variabel	f	%
Gender		
Male	64	64
Female	36	36
Ages		
>17-29 Years	35	35
30-39 Years	23	23
>40 Years	42	42
Educational		
Low	10	10
Middle	64	64
High	26	26
Type Of Job		
Gov. Employee/Army/Police	20	20
Housewife	23	23
Entrepreneur	45	45
Others	12	12
Lymphocytes CD4+ T cells Before theraphy		
<200 Sel/mm^3	70	70

201 - 350 Sel/mm^3	24	24
>350 Sel/mm^3	6	6
Lymphocytes CD4+ T cells After theraphy		
<200 Sel/mm^3	33	33
201 - 350 Sel/mm^3	40	40
>350 Sel/mm^3	27	27

Table 2.
Changes in Lymphocytes CD4+ T before and after therapy

Variabel	f	Lymphocytes CD4+ T cells Before theraphy		Lymphocytes CD4+ T cells After theraphy	
		<200 - 350 Sel/mm3	> 350 Sel / mm3	<200 - 350 Sel/mm3	> 350 Sel / mm3
Gender		n = 94	n = 6	n = 73	n = 27
Male	64	61	3	48	16
Female	36	33	3	25	11
Ages					
>17-29 Years	35	32	3	28	8
30-39 Years	23	21	2	16	6
>40 Years	42	41	1	29	13
Educational					
Low	10	10	0	8	2
Middle	64	59	5	45	19
High	26	25	1	20	6
Type Of Job					
Gov. Employee/Army/Police	20	20	0	16	4
Housewife	23	21	2	16	7
Entrepreneur	45	42	3	31	14
Others	12	11	1	10	2

Table 2 before therapy, 94% of patients had Lymphocytes CD4+ T cells counts <200-350 cells/mm^3, but after therapy there was a decrease to 73%. This shows that from 94 people who have a Lymphocytes CD4+ T cells count <200-350 cells/mm^3 there is an increase in the number of cells by 21 people to Lymphocytes CD4+ T cells count > 350 Sel / mm3 .

Table 3. Changes Lymphocytes CD4+ T cells Before dan After theraphy

Lymphocytes CD4+ T cells Before dan After theraphy				
	Mean	SD	Δ	p
Lymphocytes CD4+ T cells Before Theraphy	157.29	105.203	96.87	0.000
Lymphocytes CD4+ T cells After ttheraphy	254.16	138.461		

Table 3 shows that after taking ARV therapy, almost all of the variables studied experienced an increase in the number of Lymphocytes CD4+ T cells counts with an initial average before therapy of 157.29 cells/mm^3 and after therapy to 254.16 cells/mm3 with an average difference of 96.87 cells/mm3. The average difference before and after therapy using Test with p-value 0.000 (p-value <0.05) indicates that there is a significant difference between the number of

Lymphocytes CD4+ T cells counts before and after therapy.

DISCUSSION

The results of the analysis in this study showed that 21% of subjects experienced an increase in Lymphocytes CD4+ T cells counts >350 cells/mm^3 and as many as 79% of subjects did not experience an increase in Lymphocytes CD4+ T cells counts after undergoing ARV therapy. This result is relatively low when compared to the treatment outcome in Switzerland where the success of Lymphocytes CD4+ T cells counts increase >350 cells/mm^3 was about 83% (Kaufmann et al., 2005) and 69% in Spain (Garcia et al., 2004). In this study, the percentage of subjects who experienced an increase in their Lymphocytes CD4+ T cells counts >350 cells/mm^3 after undergoing antiretroviral therapy was very low. This may be due to the fact that most of the subjects had severe immunosuppression at the start of therapy which was characterized by low Lymphocytes CD4+ T cells counts in most of the subjects at the start of treatment. Most of the subjects in this study had very low CD4+ T cell counts at the start of therapy with a Lymphocytes CD4+ T cells counts <200 cells/mm3 of 94%, and who started with a Lymphocytes CD4+ T cells counts 200–350 cells/mm^3 of 6 %. This shows that to achieve therapeutic success, the subject needs a longer time to achieve therapeutic success based on a referral from the Indonesian Ministry of Health, namely the number of Lymphocytes CD4+ T cells counts >350 cells/mm^3.

CONCLUTION

Based on research conducted on 100 subjects from medical record data of HIV/AIDS patients who visited Prof. Hospital. Dr. W.Z Johanes Kupang for the period January 2020 - December 2021 it can be concluded that The average difference before and after therapy using Test with p-value 0.000 (p-value <0.05) indicates that there is a significant difference between the number of Lymphocytes CD4+ T cells counts before and after therapy.

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