1st International Conference on Health and Medicine
Volume 2023
http://dx.doi.org/10.11594/nstp.2023.3509

NST Proceedings
OPEN ACCESS

Conference Paper

The Socio-demographics and Clinical Characteristics and CD4 Profile of HIV/AIDS Patients Receiving First Line Antiretroviral Therapy at a Public Hospital in Palu

Alwiyah Mukaddas[1,2]*, Ingrid Faustine[1], Pupuy Astarina Pilanto[1], Nurhayati Adnan[2]

[1]Department of Pharmacy, FMIPA, Universitas Tadulako, Palu 94148, Central Sulawesi, Indonesia
[2]Department of Epidemiologi, FKM, Universitas Indonesia, Depok 16424, West Java, Indonesia

Corresponding author:
E-mail:
alwiyah.mukaddas@gmail.com

ABSTRACT

The Joint United Nations Program on HIV/AIDS (UNAIDS) set the pushful 90-90-90 target in 2015. It can be a difficult target to achieve without a comprehensive understanding of HIV epidemiology. This study aims to identify demographic and clinical characteristics and determine the difference between CD4 counts pre and post-antiretroviral (ARV) therapy in HIV patients of HIV/AIDS at a Public Hospital in Palu. A retrospective cross-sectional study of 27 HIV/AIDS patients was conducted between January 2011 and December 2015. Data were collected from medical records and electronic registries for HIV/AIDS patients. The study included 27 patients with complete data set from 230 patients, 63% productive age (25 - 44 years), 77,8% male, 85,2% were employed, 48,1% were well educated (from senior high school and equal), and 59,3% were married. The majority of patients acquired HIV through heterosexual transmission, 40,7%. At the time of the first clinic visit, 40,7% of patients had WHO stage III HIV infection. The rates of Candidiasis and TB coinfections were 22,2% and 18,5%, respectively. ZDV/3TC/NVP (74,1%) is the most commonly used antiretroviral combination. The baseline CD4+ cells count was < 350 cells/mm3 in 100% (n = 27) of patients, CD4+ median 126 cells/mm3. After Antiretroviral Therapy (ART) 6 months, two patients had a normal range CD4 500-1300 cells/mm3, CD4+ median 203 cells/mm3. There was a significant increase in CD4 count after ARV therapy (p=0,000; p<0,05). It suggests that ARV therapy can improve CD4 and immune recovery in HIV/AIDS patients.

Keywords: CD4, Antiretroviral, HIV/AIDS

Introduction

The Joint United Nations Program on HIV/AIDS (UNAIDS) set the pushful 90-90-90 target in 2015. This global target states that 30 million people will be on treatment by 2020, 90% of all people living with HIV (PLHIV) will know their HIV status, 90% of those diagnosed will receive ART, and 90% of those receiving ART will have viral suppression (UNAIDS, 2015). In 2017, there were more than 36.9 million people living with HIV (35.1 million adults and 1.8 million children), 1.8 million new cases of HIV, and 940 000 people in the world died of HIV/AIDS (UNAIDS, 2018). Global data from UNAIDS 2021, 37.7 million PLHIV, 1.5 million people newly infected with HIV, 680 000 deaths due to AIDS and 28.2 million (75%) have received ARV therapy. Asia-Pacific is second ranks only to East and South Africa, with 5.8 million people living with HIV, 240 000 new HIV infections, 130 000 AIDS-related deaths, and 3.7 million (64%) have received ARV therapy (UNAIDS, 2021). It shows that the prevalence and incidence of HIV/AIDS are increasing yearly, ARV access in Asia-Pacific countries is lower than the global average, and the goal of UNAIDS in 2020 is not achieved.

ART is a therapy used to treat people living with HIV/AIDS (PLWHA). First-line ART has proven helpful for prevention, clinically beneficial, increases life expectancy, and lowers the

How to cite:
Mukaddas, A., Faustine, I., Pilanto, P. A., & Adnan, N. (2023). The socio-demographics and clinical characteristics and CD4 Profile of HIV/AIDS patients receiving first line antiretroviral therapy at a Public Hospital in Palu. *The 1st International Conference on Health and Medicine*. NST Proceedings. pages 67-72. doi: 10.11594/ nstp.2023.3509

incidence of HIV-related infections in the population. Monitoring the therapeutic effects of ART is carried out in two ways: by examining immunological and virological responses (Kemenkes RI, 2019). CD4 (Cluster of Differentiation 4) is a marker of immunity found on the surface of T-helper lymphocyte cells that plays a role in inducing cellular immune responses (Tian et al., 2022).

The time of initiation of ART is associated with differences in outcomes and CD4 levels in HIV-positive cases. Within one year since the initiation of ART, it was found that most respondents experienced an increase in CD4 levels of ≥100 cells/mm^3 greater than an increase of <100 cells/mm^3 (Putri et al., 2018).

Palu is classified as a low-prevalence city for HIV/AIDS in Indonesia. The Palu City Health Office found approximately 151 cases of HIV/AIDS from January to October 2022. There were an additional 38 cases compared to 2021, around 113 cases at the same time interval. The incidence of HIV/AIDS in Palu City is increasing every year. It can be overcome with a comprehensive understanding of HIV epidemiology in Palu City is needed which may have different patient characteristics from other cities in Indonesia. This study aims to identify demographic and clinical characteristics and determine the difference between CD4 counts pre and post-antiretroviral therapy in HIV/AIDS patients at a Public Hospital in Palu.

Material and Methods

A retrospective cross-sectional study of HIV/AIDS patients was conducted between January 2011 - December 2015. The population in this study was all HIV/AIDS patients undergoing first-line ARV treatment at RSU Anutapura Palu and RSUD Undata Palu. The samples in this study were all patients with the eligibility criteria HIV/AIDS patients aged ≥ 15 years, who received first-line ARV treatment for six months, CD4 count before and after therapy, Non-pregnant HIV/AIDS patients, and complete medical records.

Data were collected from medical records and electronic registries for HIV/AIDS patients, including patient identity (medical record number, date of birth, patient's age, gender, occupation, education level and marital status), clinical data (clinical stage, risk factors and opportunistic infections), ARV regimen and CD4 count.

Descriptive statistics were used to analyze the data. For categorical variables, frequencies and percentages were reported. Mean, and median were used for continuous variables to summarize the data. Differences between pre-post tests were analyzed using the Wilcoxon Signed Rank Test, and the significance level was set at $p < 0.05$. Statistical analyses were conducted using SPSS Statistics.

Results and Discussion

Table 1. The sociodemographic characteristics of HIV/AIDS patients at Public Hospital in Palu for the period 2011-2015

Characteristic Patient	Number of Patients (n = 27)	Percentage (%)
Gender		
Man	21	77,8
Woman	6	22,2
Age		
15-24 years	9	33,3
25-44 years	17	63
45-64 years old	1	3,7
≥ 65 years old	0	0

To be continued…

Employment		
unemployment	4	14,8
employe	23	85,2
Education		
Elementary	3	11,1
Junior High School	4	14,8
Senior High School	13	48,1
S1	7	25,9
Marital Status		
Marry	16	59,3
Unmarried	11	40,7

Table 1 shows that the sex that predominantly suffers from HIV/AIDS is 21 PLHIV men (77.8%). Various studies show similar results (Aryani & Pramitasari, 2018; Sok et al., 2006; Widiastuti & Fibriana, 2022). The high proportion of men who have HIV is assumed to be due to the large number of men who have sex Sexually at risk and use injecting drugs compared to women who get them more often from their sexual partners (Aryani & Pramitasari, 2018). Based on SIHA data on the number of HIV infections in 2010-2019 reported by age group, the age group of 25-49 years or productive age has the highest number of HIV infections each year (Kemenkes RI, 2019). This study had an identical result, the most PLHIV in the age range of 25-44 years (62.96%). The period from a patient contracting HIV to AIDS can last for a long time, between 5 to 10 years. Most have been exposed to HIV during late adolescence and early adulthood, diagnosed at 30-40 (Saktina & Satriyasa, 2017).

The majority of PLHIV affected by HIV/AIDS were employed by 23 PLHIV (85.2%). Other things can also be the cause that by having a job, a person quickly engages in risky sexual behaviours such as casual sex without using a condom, having sexual relations with commercial sex workers, and using illegal drugs with syringes with income earned from his job. In this study, PLHIV with high school education level has the highest percentage, as many as 13 PLHIV (48.1%). This study's results align with Amelia's research, which showed that most people with HIV / AIDS had a high school education level (48.2%) (Amelia et al., 2017). It shows that sexual education needs to be taught because one can assume risky behaviour is too fatal, affecting a person's life later.

Table 2. Clinical characteristics of HIV/AIDS patients at Public Hospital in Palu for the period 2011-2015

Clinical Characteristic	**Number of patients (n=27)**	**Percentage (%)**
Risk factors		
Heterosexual	11	40,7
Homosexual	7	25,9
Injecting Drug User (IDU)	2	7,4
Bisexual	1	3,7
IDU+Heterosexual	1	3,7
Other	5	18,5
Clinical Stage		
I	9	33,3
II	7	25,9
III	11	40,7

To be continued…

Opportunistic infections		
Candidiasis	6	22,2
Tuberculosis	5	18,5
Cryptosporidiosis diarrhea	3	11,1
Herpes simplex	1	3,7
None	16	59,3
ARV Combination		
ZDV(300)+3TC(150)+EFV(600)	4	14,8
ZDV(300)+3TC(150)+NVP(200)	20	74,1
TDF(300)+3TC(300)+EFV(600)	3	11,1

This study found that married PLHIV had a more significant percentage than unmarried people, namely as many as 16 PLHIV (59.3%). This study is in line with research conducted by Yuliandra, also showing that the patients who suffer the most from HIV / AIDS are in the married group, with a percentage (58.43%) of 52 patients (Yuliandra et al., 2017). It may be the reason why most PLHIV with married status is because they only find out and check themselves after many years before who may have been infected with HIV because of risk factors carried out since they were young such as free sex and unwittingly after marriage, they also transmit the virus to their partners who have never been previously infected with HIV. Marshalita 2020 showed a different result, namely, 53.4% of PLHIV are unmarried (Marshalita, 2020).

PLWHA with heterosexual risk factors has a more significant percentage (47.7%) (Table 2). The other study stated that there were 46% of patients with the most significant risk heterosexual (Marshalita, 2020). Risk factors must be identified to determine how to transmit HIV/AIDS. Clinical stage III is the most commonly suffered by PLWHA (40.7%). Elim showed that most samples were patients with clinical stage III (57.9%). Candidiasis and Tuberculosis is the most common opportunistic infection, and all were patients with clinical stage III who had CD4 levels at the initial examination, which was < 200 cells/mm3. Some patients suffer from more than one opportunistic infection. Patients do not realize they have HIV until opportunistic infections appear, so they only check themselves when the condition is severe, and the number of CD4 has decreased.

The widely used ARV combination is Zidovudin + Lamivudine + Nevirapine because the combination is the first choice for patients who, in their examination, do not have liver and blood function abnormalities. The factor that most significantly influenced the increase in mean CD4 count was the combination of ARVs. The selection of ARV combinations is adjusted to the clinical condition and complete blood test of HIV/AIDS patients. HIV patients must be found earlier (before the AIDS stage) to get optimal results from ARV treatment.

Table 3. CD Categories Pre and Post ART of HIV/AIDS patients at Public Hospital in Palu for the period 2011-2015

CD4 categories (cell/mm^3)	Number of Patients (n=27)		Percentage (%)	
	Pre	Post	Pre	Post
Normal (500-1300)	0	2	0	7,4
Low (<350)	27	25	100	92,6
High (>1300)	0	0	0	0

Table 4. CD Profile of HIV/AIDS patients at Public Hospital in Palu for the period 2011-2015

	Pre CD4 (cell/mm^3)	Post CD4 (cell/mm^3)
n	27	27
Sum (total)	3511	5789
Range	319	538
Min	2	18
Max	321	556
Mean	130,04	214,41
Median	126,00	203,00
P	0.000	

All PLWHA who checked CD4 before receiving ARV therapy had their CD4 cell count in the low category, and CD4 test results after using ARV therapy for six months showed that only two PLWHA (7.4%) achieved the therapeutic target. At the same time, 25 PLWHA (92.6%) CD4 counts increased but did not into the normal categories (Table 3). They did not know that they had been exposed to HIV for several years and checked themselves after their immune systems began to decline. The results of the average number of initial CD4 were 130.04 cells/mm^3, and the average post-ART CD4 was 214.42 cells / mm^3 with a significance value of 0.000 ($p < 0.05$) (table 4), so it was concluded that the average CD4 count of HIV / AIDS patients before and after therapy there was a significant difference. Kurniawan et al. (2017) stated that an increase in CD4 <50 cells/mm^3 after at least six months of therapy predicts virological failure in patients receiving first-line ARV therapy with good medication adherence. Many factors can cause suboptimal immunological response, such as oral candidiasis, Hepatitis-C co-infection, starting ARV treatment at the time of meagre CD4 lymphocyte count, and older age (Balestre et al., 2012; Greub et al., 2000; Sitorus et al., 2020).

The main limitations of our study is its cross-sectional design where many data is missing resulting in a smaller sample size. The study data were collected from a public hospital in Palu city, and this might not fully be representative of the province as a whole. Our results may only apply to Palu city or city with similar HIV prevalence rates.

Conclusion

In the HIV/AIDS patients in Palu, productive age (25 - 44 years), male, employed, well educated (from senior high school and equal), married, clinical stage III, heterosexual risk factor, IO Candidiasis were very frequent. There was a significant increase in CD4 count after ARV therapy ($p=0,000$; $p<0,05$). It suggests that ARV therapy can improve CD4 and immune recovery in HIV/AIDS patients.

Acknowledgment

This work was financially supported by DIPA UNTAD. Therefore, we are grateful for this funding and support of this research.

References

Amelia, M., Hadisaputro, S., Laksono, B., & Anies, A. (2016). Faktor risiko yang berpengaruh terhadap kejadian HIV/AIDS pada laki-laki umur 25-44 tahun di Kota Dili, Timor Leste. *Jurnal Epidemiologi Kesehatan Komunitas, 1*(1), 39-46.

Aryani, L., & Pramitasari, R. (2018). The development of HIV cases in Semarang : Review of characteristics and environmental aspects. *Jurnal Kesehat Masyarakat Indonesia*, *13*(1), 7–12.

Balestre, E., Eholié, S. P., Lokossue, A., Sow, P. S., Charurat, M., Minga, A., Drabo, J., Dabis, F., Ekouevi, D. K., & Thiébaut, R. (2012). Effect of age on immunological response in the first year of antiretroviral therapy in HIV-1-infected adults in West Africa. *AIDS*, *26*(8), 951–957. https://doi.org/10.1097/QAD.0b013e3283528ad4

Greub, G., Ledergerber, B., Battegay, M., Grob, P., Perrin, L., Furrer, H., Burgisser, P., Erb, P., Boggian, K., Piffaretti, J. C., Hirschel, B., Janin, P., Francioli, P., Flepp, M., & Telenti, A. (2000). Clinical progression, survival, and immune recovery during antiretroviral therapy in patients with HIV-1 and hepatitis C virus coinfection: The swiss HIV cohort study. *Lancet*, *356*(9244), 1800–1805. https://doi.org/10.1016/S0140-6736(00)03232-3

Kemenkes RI. (2019). Pedoman Nasional Pelayanan Kedokteran Tata Laksana HIV. In *Kepmenkes RI HK.01.07/Menkes/90/2019*.

Kurniawan, F., Djauzi, S., Yunihastuti, E., & Nugroho, P. (2017). Faktor prediktor kegagalan virologis pada pasien HIV yang Mendapat terapi ARV lini pertama dengan kepatuhan berobat baik. *Jurnal Penyakit Dalam Indonesia*, *4*(1), 29. https://doi.org/10.7454/jpdi.v4i1.110

Marshalita, N. (2020). Gambaran karakteristik pasien HIV/Aids Di RSUD Dr. H. Abdul Moeloek Bandar Lampung Periode Oktober 2017 – Oktober 2018. In *JIMKI: Jurnal Ilmiah Mahasiswa Kedokteran Indonesia*, *8*(1), 8–17. https://doi.org/10.53366/jimki.v8i1.31

Putri, W. C. W. S., Sawitri, A. A. S., & Sari, K. A. K. (2018). Periode waktu inisiasi Anti-Retroviral Terapi (ART) berhubungan dengan perbedaan outcome dan tingkat kadar CD4 pada kasus HIV Positif. *Media Kesehatan Masyarakat Indonesia*, *14*(3), 217. https://doi.org/10.30597/mkmi.v14i3.4123

Saktina, P. uli, & Satriyasa, B. komang. (2017). *karakteristik penderita AIDS dan infeksi oportunistik di rumah sakit umum pusat sanglah denpasar periode juli 2013 sampai juni 2014*. *6*(3), 1–6.

Sitorus, M. A., Tarigan, J., & Tarigan, M. G. (2020). Hubungan kandidiasis oral dengan kadar cluster of differentiation pada penderita human immunodeficiency virus yang mendapat antiretroviral. *Jurnal Kedokteran Methodist, 13*(2), 45-52.

Sok, P., Harwell, J. I., McGarvey, S. T., Lurie, M., Lynen, L., Flanigan, T., & Mayer, K. H. (2006). Demographic and clinical characteristics of HIV-infected inpatients and outpatients at a Cambodian hospital. *AIDS Patient Care and STDs*, *20*(5), 369–378. https://doi.org/10.1089/apc.2006.20.369

Tian, H. fei, Xing, J., Tang, X. qian, Chi, H., Sheng, X. zhen, & Zhan, W. bin. (2022). Cluster of differentiation antigens: essential roles in the identification of teleost fish T lymphocytes. *Marine Life Science and Technology*, *4*(3), 303–316. https://doi.org/10.1007/s42995-022-00136-z

UNAIDS. (2015). *90-90-90: An ambitious treatment target to help end the AIDS epidemic*. https://www.unaids.org/en/resources/909090

UNAIDS. (2018). *UNAIDS Data 2018*. 1–376.

UNAIDS. (2021). Fact Sheet - World AIDS day 2021. *UNAIDS*.

Widiastuti, E., & Fibriana, A. I. (2022). Kejadian HIV/AIDS di Kota Semarang Tahun 2021. *Higeia Journal of Public Health Research and Development*, *6*(4), 344–355.

Yuliandra, Y., Nosa, U. S., Raveinal, R., & Almasdy, D. (2017). Terapi Antiretroviral pada Pasien HIV/AIDS di RSUP. Dr. M. Djamil Padang: Kajian Sosiodemografi dan Evaluasi Obat. *Jurnal Sains Farmasi & Klinis*, *4*(1), 1. https://doi.org/10.29208/jsfk.2017.4.1.173