

Analysis of Clinical Success in HIV/AIDS Patients with First-Line Antiretroviral Therapy

Chinthia Devientasari*, Luluk Aniqoh Meliana Putri

Universitas STRADA Indonesia, Indonesia

*Corresponden Author: Chinthia Devientasari (chinthiastrada@gmail.com)



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ABSTRACT

Background: Clinical success in HIV/AIDS patients undergoing antiretroviral therapy (ART) is influenced by various factors, including treatment adherence, regular follow-up visits, and monitoring of clinical outcomes such as weight gain and the absence of opportunistic infections (OIs). Opportunistic infections are considered a key indicator of ART failure and are strongly associated with advanced disease stages and low CD4 counts. This study aimed to analyze the demographic and clinical characteristics of HIV/AIDS patients and evaluate the relationship between body weight and the incidence of opportunistic infections in patients receiving ART

Methods: This cross-sectional study used retrospective data from 95 HIV/AIDS patients collected through consecutive sampling. Data included demographic variables (gender, age, marital status, education, occupation), clinical stage (WHO), CD4 count, body weight, ART regimen, and opportunistic infections. Data were analyzed using the Chi-square test, with a p-value ≤ 0.05 considered statistically significant.

Results: Most patients were male (52.6%) and in the productive age range of 25–46 years (74.7%). The majority were married (54.7%), had low educational attainment, and were employed (76.8%). Clinically, 88.4% were at WHO stage III, and 80% had CD4 counts < 350 cells/mm³. Low body weight (< 60 kg) was found in 93.7% of patients. Opportunistic infections occurred in 26.3% of patients. A statistically significant association was found between body weight and opportunistic infections ($p = 0.041$). However, the OR of 1.086 (95% CI: 0.479–2.464) indicated no clinically significant difference in the risk of opportunistic infections between patients with body weight < 60 kg and those > 60 kg.

Conclusion: Although low body weight was statistically associated with opportunistic infections, it did not present a significantly increased clinical risk. Nonetheless, opportunistic infections among patients highlights the importance of early intervention, nutritional support, and timely initiation of ART to improve treatment outcomes in HIV/AIDS management.

I. Introduction

The success of antiretroviral therapy (ART) in HIV/AIDS patients is intricately linked to the active involvement of patients in adhering to medication regimens and consistently attending healthcare facilities for monitoring purposes. This monitoring is crucial for assessing clinical outcomes, notably the improvement in opportunistic infections and the increase in patient weight. According to the Ministry of Health of the Republic of Indonesia (Dessu et al., 2021), therapy failure in HIV/AIDS patients can be clinically identified through the emergence of new or recurrent opportunistic infections, classified as

WHO clinical stage 4. This classification highlights the severity of the patient's condition and underscores the critical need for effective management strategies.

Research conducted by Dereje et al. (2019) further elucidates the relationship between opportunistic infections and the efficacy of antiretroviral therapy. Their findings reveal that patients infected with HIV who have not yet commenced ART exhibit a significantly higher rate of opportunistic infections—38% as compared to 29.2% in those undergoing therapy. This stark contrast underscores the importance of early initiation of ART, particularly for patients presenting with opportunistic infections, irrespective of their CD4 cell count. Such an approach is vital, as it not only mitigates the immediate risks associated with these infections but also enhances the overall prognosis for patients.

Among the various opportunistic infections, tuberculosis (TB) stands out as a particularly formidable threat to the health of HIV/AIDS patients. Haile et al. (2021) identify TB infections as the leading cause of therapy failure, emphasising the need for rigorous screening and timely treatment interventions. Patients commencing ART with a CD4 count of around 200 cells/mm³ (with a range of 72-334 cells/mm³) often experience a deceleration in immunological recovery by the fourth year of treatment. This stagnation can prevent CD4 counts from exceeding the critical threshold of 500 cells/mm³, thereby heightening the risks of morbidity and mortality among this vulnerable population (Nugroho et al., 2018).

The clinical manifestations of HIV/AIDS, particularly opportunistic infections, necessitate a comprehensive understanding of the factors contributing to poor retention in care. A study by Haile et al. (2016) employs multivariate analysis to demonstrate that opportunistic infections are a significant risk factor for delays in initiating antiretroviral therapy in HIV patients, with an odds ratio of 1.99 ($p=0.007$). This statistic not only highlights the urgency of addressing opportunistic infections but also calls for a more integrated approach to patient care that prioritises early intervention and consistent monitoring.

Antiretroviral (ARV) therapy plays a pivotal role in the management of HIV, serving multiple purposes: it reduces the transmission rate of HIV within communities, decreases HIV-related morbidity and mortality, enhances the quality of life for individuals living with HIV (PLWHA), and preserves immune function while ensuring maximal and sustained suppression of viral replication (Ratnawati Riska, 2017). The implications of decreased immunity are profound, rendering individuals particularly susceptible to a myriad of infectious diseases, commonly referred to as opportunistic infections (Ministry of Health of the Republic of Indonesia, 2021).

The efficacy of ARV treatment in preventing HIV transmission is well-documented, with ARV medications functioning by inhibiting viral replication and gradually lowering the viral load in the bloodstream. Observational studies have provided compelling evidence of reduced HIV transmission rates among serodiscordant couples—those in which one partner is HIV-positive and the other is not who are receiving ARV treatment (Suprobawati & Kurniati, 2018). This finding underscores the broader public health implications of ART, as it not only serves to protect the health of individual patients but also contributes to the overall reduction of HIV transmission within communities.

Success of antiretroviral therapy in managing HIV/AIDS is a multifaceted issue that hinges on patient engagement, timely initiation of treatment, and the effective management of opportunistic infections. The relationship between these factors is critical; early intervention and consistent monitoring can significantly enhance patient outcomes, reduce morbidity and mortality, and ultimately contribute to the broader goal of controlling HIV transmission. By prioritising patient compliance and integrating comprehensive care strategies, healthcare providers can make substantial strides in improving the lives of those affected by HIV/AIDS while simultaneously addressing the public health challenges posed by the epidemic. The ongoing commitment to research and innovation in this field will be essential in ensuring that ART remains a cornerstone of effective HIV management in the years to come.

II. METHODS

This study uses a cross-sectional design with retrospective data collection. Data were collected using consecutive sampling techniques, namely samples were selected based on predetermined inclusion and exclusion criteria and the sampling process ended after the sample size was sufficient or the specified research time limit had been reached. The type of data in this study is quantitative. Data obtained in data collection were analyzed using Statistical Package for Social Sciences (SPSS) 25. Data analysis using

Chi-square with a p-value ≤ 0.05 is considered to have a significant relationship. The confidence level used is 5% ($\alpha = 0.05$) with a 95% confidence interval. Demographic characteristics data: gender (male/female), age (<24, 25-35, 36-46, >47 years), marital status (unmarried, married, widow/widower), educational status (no school, elementary school, junior high school, high school), occupation (working, not working), WHO clinical stage (I, II, III, IV), CD4 (<350, >350), body weight (<60, >60), ARV guidelines (TDF+3TC+EFV; AZT+3TC+NVP; AZT+3TC+EFV; TDF+3TC+NVP), opportunistic infections (yes, no). The sample in this study was 95 respondents.

III. RESULT

This study analyzes demographic and social characteristics data. Demographic characteristics are divided into gender, age, marital status, education status, occupation, clinical stage, CD4 count, body weight, ARV guidelines, and opportunistic infections.

Demographic Characteristic

Table 1. Demographic Characteristics: Clinical Success in HIV/AIDS Patients

Demographic Characteristics	N (%)
Gender	
Male	50 (52,6%)
Female	45 (47,2%)
Age	
<24	5 (5,3%)
25-35	31 (32,6%)
36-46	40 (42,1%)
>47	19 (20,0%)
Marital Status	
Single	27 (28,4%)
Married	52 (54,7%)
Education Status	
No Schooling	6 (6,3%)
Elementary School	30 (31,6%)
Junior High School	30 (31,6%)
High School	23 (24,2%)
College/University	6 (6,3%)
Occupation	
Employed	73 (76,8%)
Not Working	22 (23,2%)
Clinical Stage (WHO)	
I	0 (0,0%)
II	5 (5,3%)
III	84 (88,4%)
IV	6 (6,3%)
CD4 Baseline	
<350	76 (80,0%)
>350	19 (20,0%)

Weight		
	<60	89 (93,7%)
	>60	6 (6,3%)
ARV		
	TDF + 3TC + EFV	15 (15,8%)
	AZT + 3TC + NVP	74 (77,9%)
	AZT + 3TC + EFV	4 (4,2%)
	TDF + 3TC + NVP	2 (2,2%)
Opportunistic Infection		
	Yes	25 (26,3%)
	No	70 (73,7%)

Table 2. Bivariate Analysis of Body Weight with Opportunistic Infections

Variable	Weigh <60 n=89	Weigh >60 n=6	P-value	OR(95%)
Opportunistic Infection				
Yes	23 (92,0%)	2(8,0%)	0,041	1,086 (0,479-2,464)
No	66(94,3%)	4(5,7%)		

IV. DISCUSSION

Based on the demographic and clinical characteristics of HIV patients, several important insights can be obtained regarding the profile of the population studied and its implications for antiretroviral (ARV) therapy management and clinical success. Gender distribution shows that the majority of respondents were male (52.6%), with slightly more than female (47.2%). This aligns with several previous studies showing that men tend to be more frequently diagnosed with HIV but have higher rates of delay in initiating therapy than women (UNAIDS, 2018). In terms of age, the majority of respondents were in the productive age range, namely 36–46 years (42.1%) and 25–35 years (32.6%). This age group is economically and socially crucial, so effective HIV management among them will have a significant impact on productivity and the public health burden.

Marital Status and Education most patients were married (54.7%), indicating the potential for transmission within couples. Therefore, a couple-based intervention approach also needs to be considered in prevention and treatment programs. Respondents' educational attainment was relatively low, with the majority only completing elementary school (31.6%) or junior high school (31.6%), and only 6.3% having a college degree. Low educational attainment can impact patients' understanding of their disease, medication adherence, and access to healthcare services. Therefore, simple and easy-to-understand educational strategies are crucial (Adelekan et al., 2019). The majority of respondents (76.8%) were employed. This indicates that most patients still have productive capacity, but also means they need a flexible healthcare system to ensure it doesn't interfere with their work, including scheduled visits and community-based services (Solomon et al., 2018). Majority of patients were in clinical stage III according to the WHO classification (88.4%), while none were in stage I. This indicates that most patients presented with symptoms or complications, reflecting a delay in diagnosis and early intervention.

This is supported by baseline CD4 data, which showed that 80% of patients had CD4 levels <350 cells/mm³, indicating severe immunosuppression. This condition increases the risk of opportunistic infections and requires comprehensive management. 93.7% of patients weighed <60 kg, which can be an indicator of malnutrition or the impact of chronic infections such as HIV. Low body weight in HIV patients is often associated with poorer clinical outcomes and slower therapy responses (WHO, 2021).

Most patients used the AZT + 3TC + NVP regimen (77.9%), which is one of the standard first-line regimens in many developing countries. However, this proportion highlights the importance of regularly evaluating the effectiveness of the regimen, including drug resistance and potential side effects. A significant number of 26.3% of patients experienced opportunistic infections, reflecting delays in therapy initiation and the patients' poor immunological status at the time of treatment initiation (Lundgren et al., 2018). Controlling opportunistic infections should be an integral part of HIV management, particularly in patients with low CD4 counts.

Table 2 shows the results of the analysis of the relationship between patient weight (<60 kg and >60 kg) and the incidence of opportunistic infections in HIV patients undergoing antiretroviral (ARV) therapy. Weight is often an indicator of nutritional status and general clinical condition in HIV patients, which directly impacts immunity and susceptibility to infection. Of the 95 patients, 89 (93.7%) weighed <60 kg, and only 6 (6.3%) weighed >60 kg. Among patients with opportunistic infections: 23 patients (92.0%) weighed <60 kg, 2 patients (8.0%) weighed >60 kg. Meanwhile, among patients without opportunistic infections: 66 patients (94.3%) weighed <60 kg, 4 patients (5.7%) weighed >60 kg. The statistical test results showed a p-value of 0.041, which is below the 0.05 significance level. This indicates a statistically significant association between body weight and the incidence of opportunistic infections. However, the Odds Ratio (OR) value of 1.086 with a 95% Confidence Interval (CI) of 0.479–2.464 indicates that clinically, patients weighing <60 kg do not have a statistically significant higher risk of developing opportunistic infections than patients weighing >60 kg. Because the CI includes 1, this result is considered not clinically significant, despite being statistically significant. These results demonstrate that, despite the statistically significant difference, a body weight of <60 kg does not necessarily significantly increase the risk of opportunistic infections (Lundgren et al., 2018)

V. CONCLUSION

Based on the analysis results, there was a statistically significant association between body weight (<60 kg and >60 kg) and the incidence of opportunistic infections in HIV/AIDS patients undergoing antiretroviral therapy ($p = 0.041$). However, the Odds Ratio (OR) value of 1.086 with a 95% Confidence Interval (CI: 0.479–2.464) indicates no clinically significant difference in risk, as the CI range encompasses 1. Therefore, although patients weighing <60 kg tend to experience more opportunistic infections, low body weight cannot be confirmed as a clinically meaningful risk factor for opportunistic infections based on these data. These findings continue to emphasize the importance of paying attention to the nutritional status of HIV/AIDS patients as an integral part of therapy management.

VI. ACKNOWLEDGMENTS

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VII. CONFLICTS OF INTEREST

The authors declare that this study is free from any conflicts of interest

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