Medical : Jurnal Kesehatan Dan Kedokteran
Volume 3, Issue 1, January-June 2026
e-ISSN: 3064-6472 (online)
https://jurnal.sinesia.id/index.php/Medical-JKK/index

Pharmacist Counselling and Antiretroviral Medication Adherence Among HIV Patients at Hospital X

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Info Article
|Submitted: 10 March 2026 **|Revised**: 10 June 2026 **|Accepted**: 20 June 2026
|Published: 30 June 2026
How to cite: Muhammad Abyaz Dampang, etc., "Pharmacist Counselling and Antiretroviral Medication Adherence Among HIV Patients at Hospital X", *Medical : Jurnal Kesehatan Dan Kedokteran*, Vol. 3, Issue 1, January-June, 2026, P. 180-188.

ABSTRACT

Adherence to antiretroviral therapy (ART) is essential for achieving viral suppression, maintaining immune function, and preventing HIV transmission. However, medication adherence among people living with HIV (PLHIV) in Indonesia remains a significant challenge, potentially increasing the risk of treatment failure and antiretroviral drug resistance. This study aimed to evaluate the effect of pharmacist counseling on ART adherence among HIV patients at Hospital X, North Jakarta. A quantitative study using a single-arm pretest-posttest quasi-experimental design was conducted from February to April 2026. A total of 24 HIV patients receiving fixed-dose combination antiretroviral therapy were recruited using a total sampling technique. Medication adherence was measured before and after the pharmacist counseling intervention using the eight-item Morisky Medication Adherence Scale (MMAS-8). The data were analyzed using the Wilcoxon Signed-Rank Test because the pretest and posttest scores did not follow a normal distribution. Most participants were male (87.5%), aged 25–49 years (66.7%), and had been diagnosed with HIV for 1–3 years (70.8%). All participants received fixed-dose combination therapy, consisting of TLE (54.2%) and TLD (45.8%) regimens. Before counseling, 87.5% of participants demonstrated low medication adherence, while none achieved high adherence. Following the intervention, the proportion of patients with low adherence decreased to 37.5%, whereas medium and high adherence increased to 41.7% and 20.8%, respectively. The mean MMAS-8 score increased from 3.18 ± 0.40 before counseling to 6.53 ± 0.24 afterward, with a statistically significant difference ($p < 0.001$). These findings indicate that pharmacist counseling significantly improves ART adherence among HIV patients. Therefore, structured pharmacist counseling should be integrated into routine HIV pharmaceutical care and accompanied by strategies addressing medication side effects and psychosocial support to sustain adherence and optimize treatment outcomes.

Keyword: *antiretroviral therapy; medication adherence; pharmacist counseling; HIV*

Introduction

Human Immunodeficiency Virus (HIV) progressively destroys the host immune system, leaving infected individuals highly susceptible to secondary infections. Patients with confirmed HIV infection must adhere strictly to antiretroviral (ARV) therapy to suppress viral replication; adequately suppressed viral load not only prevents transmission to others but also preserves the patient's quality of life. Early detection followed by prompt initiation of ART is critical to prevent progression toward the terminal stage of infection, Acquired Immunodeficiency Syndrome (AIDS), during which patients become vulnerable to fatal opportunistic infections (Kemenkes, 2023). According to joint WHO-UNAIDS estimates, 40.8 million individuals worldwide were infected with HIV in 2024, alongside 1.3 million newly diagnosed cases and roughly 630,000 fatalities linked to AIDS documented during that period. Even though access to ART has expanded

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substantially to reach 31.6 million patients, this persistently high prevalence indicates that HIV continues to burden global health systems despite intensified control programs (UNAIDS, 2024).

HIV also remains a disease of substantial concern in Indonesia. National health data reported a cumulative total of more than 36,902 people living with HIV (PLHIV) in 2021, rising to 57,299 identified cases by 2023, with the Ministry of Health noting a continuing annual increase that places HIV among the country's high-burden infectious diseases. Within this national picture, DKI Jakarta ranks fourth among Indonesian provinces by cumulative case load, with 5,569 recorded cases (Kemenkes, 2023).

HIV primarily targets CD4+ T lymphocytes, degrading the cellular immune defenses needed to control opportunistic pathogens such as tuberculosis, fungal infections, severe bacterial disease, and certain malignancies. Patients diagnosed with HIV require early initiation of ART together with regular clinical and laboratory monitoring, including quantification of viral load. Highly disciplined treatment adherence blocks onward transmission to uninfected individuals. CD4 cell counts, which typically range between 500 and 1,500 cells/mm3 in untreated or treatment-naive individuals and progressively decline in the absence of effective therapy, are used to gauge immunologic status at diagnosis and during follow-up. A CD4 count below 200 cells/mm3 defines advanced HIV disease (AHD), a stage marked by severe immunocompromise and heightened vulnerability to fatal complications (World Health Organization, 2025).

Antiretroviral therapy remains the most effective therapeutic strategy currently available for managing HIV infection (JIP, 2020). ARV agents suppress viral replication, restore immune function, reduce the incidence of opportunistic complications, improve daily quality of life, and lower morbidity among people living with HIV. Because ART requires lifelong combination therapy with strict dosing schedules, patients must sustain adherence levels above 95% to avoid drug resistance and prevent onward transmission. However, Ministry of Health data indicate that adherence among Indonesian HIV patients remained low through 2020, ranging between only 40% and 70%, well short of the 95% national target (Kensanovanto & Perwitasari, 2022). Contributing factors identified in the literature include insufficient social support, limited health knowledge, high pill burden, and the extent of pharmacist involvement in HIV medication counseling (Harison, 2020). Pharmacist-led interventions have also been shown to improve ART adherence and other clinical outcomes among people living with HIV/AIDS (Hossain, 2022).

Evidence on the relationship between counseling and adherence, however, remains mixed. This inconsistency is also reflected in an Indonesian mixed-methods study in Bali, which found that counseling did not significantly improve ART

compliance, suggesting that counseling alone may be insufficient when other adherence barriers remain unresolved (Sawitri AAS, 2021). A 2025 study conducted at a health facility in Garut demonstrated a strong association between post-counseling patient knowledge and adherence discipline, indicating that improved patient understanding translates directly into stronger adherence to ART regimens (Fadhilla, 2025). Conversely, a separate 2024 study reported no significant association between post-counseling education and adherence levels, attributing this discrepancy to external and internal factors such as low personal motivation, poor tolerance of medication side effects, absence of family support, and patient reluctance to refill prescriptions at the pharmacy (Lestari, 2024). In Indonesia, social support has also been identified as an important factor associated with adherence to ARV treatment among people living with HIV (Riska et al., 2025). These findings are consistent with evidence from Indonesia showing that ART adherence is influenced by multiple individual, interpersonal, and healthcare-related barriers (Hutahaean et al., 2023).

Most disease burden and death rates within the HIV/AIDS population, in both low-resource and industrialized settings, stems from opportunistic infections (Saeed, 2015), which remain the dominant driver of HIV/AIDS-related death. In the Indonesian context, the most frequently documented opportunistic infections are mucocutaneous candidiasis (80.8%), tuberculosis co-infection (40.1%), cytomegalovirus infection (28.8%), as well as toxoplasma encephalitis (17.3%), and pneumonia caused by Pneumocystis carinii (Nyoman et al., 2014). Furthermore, a forward-looking observational study conducted in Indonesia, which investigated initial patient profiles and survival rates over a twelve-month period, noted that out of 4,050 infected individuals, males constituted 68.8%, heterosexual contact accounted for 53.5% of transmissions, 92.4% were already on ART upon joining the study, and 72.4% exhibited suppressed viral loads (Merati, 2025).

Given this clinical urgency and the inconsistent evidence regarding the benefit of pharmacist counseling, the present research was conducted to evaluate the impact of instructional sessions provided by pharmacists regarding ART adherence among people living with HIV attending Hospital X, North Jakarta, a setting where optimizing this pharmaceutical service is critical for minimizing the risk of drug resistance and curbing community transmission. Specifically, this study aimed to (1) describe the sociodemographic characteristics, including sex and age, of HIV patients receiving ART at this facility, and (2) determine the effect of pharmacist counseling on ART adherence among these patients .

Methods

Research Design

This research utilized a quantitative single-arm pretest-posttest quasi-experimental framework to assess the effect produced by pharmacist-led counseling on ART adherence among HIV patients. Adherence was assessed before and after the counseling intervention using a validated questionnaire administered to the same cohort of respondents, allowing each patient to serve as their own control (Sugiyono, 2020).

Study Setting and Duration

The study was conducted at Hospital X, located in North Jakarta, over the period February-April 2026. Study activities proceeded through sequential stages: protocol development, instrument-based data collection, data processing, statistical analysis and interpretation, and final report preparation.

Population and Sample

The target population comprised all patients with a confirmed HIV diagnosis receiving care at X Hospital, North Jakarta. A total of 24 patients meeting the eligibility criteria were enrolled using a total sampling technique.

Inclusion Criteria

Patients were eligible if they (1) were currently receiving ART, (2) had received or had not received pharmacist counseling, and (3) gave formal written agreement to take part in the research.

Exclusion Criteria

Individuals were deemed ineligible if they (1) were unable to communicate effectively, (2) declined to provide consent, or (3) were experiencing an active mental health disorder.

Data Collection

Adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8), a structured self-report questionnaire administered to each participant before and after the pharmacist counseling session (Hidayati IR, 2024). Data collection commenced following approval from the institutional research ethics board of Universitas 17 Agustus 1945 Jakarta and permission from X Hospital, North Jakarta. Sociodemographic and clinical variables collected alongside the adherence questionnaire included sex, age group, duration of HIV diagnosis, and antiretroviral regimen class (fixed-dose combination [FDC] versus non-FDC) (Nisak, 2022).

Statistical Analysis

Univariate analysis was used to characterize sociodemographic and clinical variables using frequency distributions. Prior to bivariate testing, the normality of pre-test and post-test adherence scores was assessed using the Shapiro-Wilk test in SPSS (Rusdi, 2023). Because both distributions departed significantly from

normality (pre-test p = 0.020; post-test p = 0.013), the paired pre-post MMAS-8 scores were compared using the non-parametric Wilcoxon Signed-Rank Test, with statistical significance set at a two-tailed alpha of 0.05 (Zulkipli et al., 2024).

Ethical Considerations

This study was approved by the Health Research Ethics Committee of Universitas 17 Agustus 1945 Jakarta. All participants provided informed consent prior to enrolment, and data were used exclusively for the purposes of this research.

Result and Discussion

1.1 Sociodemographic and Clinical Characteristics

Male patients predominated in this cohort (87.5%), consistent with the male-skewed epidemiology of HIV reported nationally, where the 2024 Indonesia Health Profile documented a 72%-to-28% male-to-female ratio among PLHIV (Kemenkes, 2024). Beyond biological susceptibility, this male predominance has also been linked to behavioral risk factors, including limited educational attainment, unprotected heterosexual and homosexual contact with multiple partners, and unsterile needle or piercing practices (Roza et al., 2024). The majority of patients (66.7%) fell within the economically productive age range of 25-49 years, mirroring national surveillance data that similarly identify this age band as the epidemiological peak for HIV diagnosis, likely reflecting heightened exposure to hazardous practices including condomless sexual activity as well as injecting substance abuse among adults of working age (Kemenkes, 2024).

Clinically, most participants (70.8%) had been living with HIV for 1-3 years, while the remainder (29.2%) had a diagnosis duration exceeding 36 months. Every single patient (100%) received combination therapy in fixed doses, categorized into TLE (comprising tenofovir, lamivudine, and efavirenz; 54.2%) alongside TLD (comprising tenofovir, lamivudine, and dolutegravir; 45.8%), reflecting the national shift toward dolutegravir-based first-line regimens alongside continued use of efavirenz-based combinations in this clinical population.

Table 1. Sociodemographic and Clinical Characteristics

Variable	n	%
Sex		
Male	21	87.5
Female	3	12.5
Age group		
20-24 years	4	16.7
25-49 years	16	66.7
>50 years	4	16.7
Duration of illness		
1-3 years	17	70.8
>3 years	7	29.2
ARV Regimen (FDC)		
TLE (TDF+3TC+EFV)	13	54.2
TLD (TDF+3TC+DTG)	11	45.8

1.2 Medication Adherence Before and After Counseling

Before the intervention, adherence was overwhelmingly low: 87.5% of patients scored in the low-adherence category and none achieved high adherence. Following the pharmacist counseling intervention, the distribution shifted markedly toward improved adherence, with the proportion of low-adherence patients falling to 37.5% while medium and high adherence rose to 41.7% and 20.8%, respectively. This pattern suggests that structured counseling produced a clinically meaningful, if incomplete, shift in adherence behavior across the cohort.

Table 2. Distribution of Adherence Categories Before and After Counseling (MMAS-8)

Adherence Category	n	%
Pre-test		
Low	21	87.5
Medium	3	12.5
High	0	0
Post-test		
Low	9	37.5
Medium	10	41.7
High	5	20.8

1.3 Effect of Pharmacist Counseling on Adherence

Shapiro-Wilk testing confirmed that the initial ($p = 0.020$) as well as the subsequent ($p = 0.013$) score distributions deviated significantly from normality, warranting analysis utilizing the non-parametric Wilcoxon Signed-Rank statistical approach. Mean MMAS-8 scores rose from 3.18 ± 0.40 before counseling to 6.53 ± 0.24 afterward, a difference that was highly statistically significant ($p < 0.001$). This result prompts the dismissal of the null hypothesis in favor of the alternative, establishing a substantial positive association linking pharmacist counseling with ART adherence among HIV patients at X Hospital.

Table 3. Paired Comparison of MMAS-8 Scores Before and After Counseling

Variable	Mean ± SD	p-value
MMAS-8 pre-test score	3.18 ± 0.40	<0.001
MMAS-8 post-test score	6.53 ± 0.24	

These findings corroborate a 2025 study conducted in Garut, which similarly reported a statistically significant improvement in adherence following counseling ($p = 0.000$), attributing the effect to enhanced patient understanding of ART regimens and their clinical rationale (Fadhilla, 2025). Notably, several participants in the present cohort reported discontinuing or reducing ARV intake because of adverse effects, a behavior that appeared to partially offset the benefit of counseling and may explain why a subset of patients remained in the low- or medium-adherence categories even after the intervention. This observation aligns with prior work identifying side-effect intolerance, alongside inadequate social support and low personal motivation, as persistent barriers to sustained ART adherence that counseling alone may not fully resolve (Lestari, 2024). Taken together, these results indicate that while pharmacist-led counseling meaningfully strengthens medication-taking behavior, achieving the WHO-recommended 95% adherence threshold likely requires counseling to be delivered alongside adjunctive strategies that address side-effect management and psychosocial support.

Conclusion

Among 24 HIV patients receiving antiretroviral therapy at X Hospital, North Jakarta, the cohort was predominantly male (87.5%), aged 25-49 years (66.7%), diagnosed for 1-3 years (70.8%), and treated with fixed-dose combination regimens (100%), split between TLE and TLD. Pharmacist-led counseling produced a statistically significant improvement in ART adherence, with mean MMAS-8 scores rising from 3.18 ± 0.40 to 6.53 ± 0.24 ($p < 0.001$), and the proportion of high-adherence patients increasing from 0% to 20.8%. These findings support incorporating structured, routine pharmacist counseling into standard HIV

pharmaceutical care as a means of strengthening treatment adherence, reducing the risk of drug resistance, and limiting onward viral transmission.

Suggestion

Hospital X and similar HIV care facilities are encouraged to formally incorporate structured, MMAS-8-guided pharmacist counseling into routine antiretroviral care rather than offering it on an ad hoc basis, given the substantial improvement in adherence observed following the intervention. Because several patients continued to report low or medium adherence after counseling, mainly due to medication side effects and limited psychosocial support, counseling protocols should be paired with proactive side-effect management and family or peer support strategies. Future studies with larger samples, a control group, and longer follow-up are recommended to confirm the durability of this effect and to determine the optimal frequency of pharmacist counseling sessions needed to sustain the WHO-recommended 95% adherence threshold.

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