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Duration vs Discipline: Uncovering Therapy Adherence Antiretrovirals in People with HIV

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ABSTRACT

Background: HIV is a retrovirus targeting the immune system, requiring continuous antiretroviral therapy (ARVs) for effective management. In Indonesia, 329,581 HIV cases were documented from 1987 to 2022, with only 51% receiving ARVs. Adherence is crucial for treatment success, but prolonged therapy may impact medication compliance. This study investigates the correlation between ARV treatment duration and adherence levels at Dr. Moewardi Hospital

Subjects and Method: A cross-sectional observational study was conducted at the Voluntary Counseling and Testing (VCT) clinic, involving 60 HIV-diagnosed individuals selected through purposive sampling. Therapy duration was extracted from medical records, and adherence was assessed using the MMAS-8 questionnaire during June and July 2024. Bivariate analysis employed the Spearman correlation coefficient test.

Results: The study sample predominantly consisted of individuals aged 36-45 years, with the majority having completed high school education. The mean therapy duration was 5.60 ± 3.64 years, ranging from 1 to 15 years. Adherence levels varied significantly, with 48.3% of patients demonstrating high adherence, characterized by a mean therapy duration (Mean= 6.86 years; SD= 3.62). Moderate adherence was observed in 16.7% of participants, with a mean therapy duration (Mean= 6.60 years; SD= 2.55). Low adherence was found in 35.0% of patients, associated with a shorter mean therapy duration (Mean= 3.38 years; SD= 3.14). There was a positive and significant association between therapy duration and adherence level (r= 0.415; p= 0.001).

Conclusion: The length of antiretroviral therapy (ART) exhibits a favorable correlation with adherence levels among individuals living with HIV. An extended duration of the therapeutic regimen is correlated with an enhanced adherence rate. This observation underscores the significance of sustained support, particularly during the initial years of the treatment course.

Keywords: HIV, antiretrovirals, medication adherence, duration of therapy, MMAS-8

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BACKGROUND

Human Immunodeficiency Virus (HIV) continues to pose a significant challenge to global health. The pathogen specifically targets the immune system, particularly the CD4+ T cells, and can precipitate Acquired Immunodeficiency Syndrome (AIDS) if not appropriately managed (de Souza et al., 2019; Waymack & Sundareshan, 2023). As projected by the World Health Organization

(WHO), it is estimated that by the year 2022, approximately 38.4 million individuals globally will be living with HIV, accompanied by 1.5 million new infections and 650,000 deaths attributable to AIDS annually (WHO, 2023). In the context of Indonesia, data from the Ministry of Health indicates that from 1987 until March 2022, there have been 329,581 reported cases of HIV, with 137,397 of those progressing to AIDS. Central Java holds the highest incidence of AIDS and ranks fourth in HIV prevalence on a national scale. Specifically, within Surakarta, there were 124 newly documented HIV cases in 2022, underscoring the persistent nature of this health crisis at the national level (Profil Dinas Kesehatan Kota Surakarta, 2022).

Antiretroviral therapy (ARV) constitutes the principal treatment modality for HIV, necessitating lifelong adherence. The objectives of this therapeutic approach encompass the suppression of viral replication, enhancement of patient quality of life, and mitigation of HIV transmission. The efficacy of this therapy is significantly contingent upon the patient's adherence to the prescribed medication regimen. The minimum adherence threshold required to attain optimal viral suppression is established at 95%. National statistics reveal that by September 2022, a mere 51% of HIV patients were compliant with ARV administration, while 54% demonstrated irregular adherence, 6% discontinued treatment, and 40% succumbed to the disease. This adherence rate is substantially below the WHO's benchmark of 90% for patients undergoing ARV therapy. Non-adherence poses a risk of treatment failure, the development of drug resistance, heightened susceptibility to opportunistic infections, and potentially fatal outcomes (Jiao et al., 2022).

Numerous variables can affect adherence to antiretroviral (ARV) therapy, including sociodemographic characteristics, social support systems, adverse drug reactions, stigma, and the duration of treatment. In particular, with respect to treatment duration, a number of studies have yielded contradictory findings. Research conducted by Jiao's studies in 2022 (Jiao et al., 2022) . in China indicated that an extended duration of therapy correlates with an increased risk of non-adherence (AOR=0.88; 95% CI 0.81-0.95) (Koyra, 2018). Conversely, a study by Sari (2019) in Indonesia reported a positive correlation between the length of therapy and adherence (p=0.042) (Bukenya et al., 2019). The adherence to ARV therapy is shaped by a myriad of complexities involving patient characteristics, treatment modalities, healthcare system dynamics, and factors within the social environment. The stigma associated with HIV in Indonesia remains profoundly entrenched, manifesting not only at the community level but also within healthcare settings (Hutahaean et al., 2023).

Patients initiating therapy frequently confront challenges related to the adaptation to treatment regimens, managing side effects, and navigating psychosocial stressors. In contrast, individuals who have been undergoing therapy for an extended period may encounter feelings of saturation or a perception of good health, which can lead to a decline in adherence (Kheswa, 2017). RSUD Dr. Moewardi, serving as the principal referral hospital in Surakarta, plays a pivotal role in the provision of HIV/AIDS services. Despite possessing a comprehensive service delivery framework, there exists a paucity of data elucidating the relationship between the duration of therapy and the adherence levels among HIV patients at this facility. Recognizing the critical nature of adherence to therapy and the scarcity of analogous studies within Indonesia, particularly in Surakarta, this

investigation intends to explore the correlation between the duration of ARV therapy and adherence levels among HIV patients at RSUD Dr. Moewardi. The outcomes of this research are anticipated to enhance the understanding of the temporal dynamics associated with ARV therapy adherence, thereby serving as a foundation for the formulation of more effective interventions aimed at improving patient adherence. Additionally, the insights gleaned from this study may contribute to the advancement of more efficacious policies and strategies regarding HIV/AIDS services.

SUBJECTS METHOD

1. Study Design

This was a cross-sectional study conducted at the VCT (Voluntary Counseling and Testing) clinic associated with Dr. Moewardi General Hospital in Surakarta, Indonesia.

2. Population and Sample

The population and sample for this investigation were comprised of individuals diagnosed with HIV/AIDS who were receiving care at the VCT clinic of Dr. Moewardi General Hospital. The source population consisted of HIV/AIDS patients who fulfilled the established inclusion criteria, which included: 1) individuals undergoing antiretroviral therapy (ART), 2) individuals possessing complete medical records at the VCT clinic, and 3) individuals who were aged 18 years or older. A non-probability sampling method, specifically employing purposive sampling, was utilized to identify the participants for this study. The determination of the sample size was conducted using the "Rules of Thumb" formula pertinent to cross-sectional analytical studies, yielding a minimum requisite sample size of 60 participants (Ranganathan & Aggarwal, 2019).

3. Study Variables

The independent variable in this research was the degree of adherence to therapeutic protocols among individuals diagnosed with HIV/AIDS, while the dependent variable was the length of antiretroviral therapy (ART). No confounding variables were discerned within the parameters of this investigation.

4. Operational Definition of Variables

The independent variable in this empirical investigation was identified as the degree of adherence to therapy among individuals diagnosed with HIV/AIDS, whereas the dependent variable pertained to the length of time participants engaged in antiretroviral (ARV) treatment. No confounding variables were discerned within the scope of this research. Therapy compliance: This concept was operationally defined as the affirmative and consistent adherence exhibited by patients in the pursuit of ARV treatment. The degree of therapy compliance was quantitatively assessed utilizing the Morisky Medication Adherence Scale-8 (MMAS-8) instrument. Compliance levels were classified as low (score <6), moderate (score 6-7), and high (score 8) (Sari et al., 2019). ARV therapy duration: This was delineated as the temporal extent during which the patient had been subjected to ARV treatment, quantified in years, as documented within their medical records (Framasari, 2020; Supriyatni et al., 2023).

5. Study Instruments

The data acquisition process in the present investigation incorporated two principal methodologies. Initially, the MMAS-8 questionnaire was employed to evaluate the degree of therapeutic compliance among the participants in the study (de Souza *et al.*, 2019). The MMAS-8 represents a widely recognized and empirically validated instrument for quantifying medication adherence within diverse populations

afflicted with chronic diseases, such as HIV/AIDS. Subsequently, the patients' medical records from the VCT clinic were systematically examined to extract relevant information pertaining to the duration of their antiretroviral therapy (Agustin Wulandari *et al.*, 2021; Haryatiningsih *et al.*, 2017).

6. Data analysis

Data were subjected to bivariate analysis to assess the interrelationship between two distinct variables. The Pearson correlation coefficient was utilized to ascertain both the magnitude and the directionality of the correlation between the duration of therapy and levels of adherence (Eddy Sarwono *et al.*, 2021; Zhang, 2016). A significance threshold of $\alpha = 0.05$ was established for the purpose of hypothesis testing (Eddy Sarwono *et al.*, 2021).

7. Research Ethics

This investigation was executed in compliance with established ethical standards and directives pertinent to medical research that encompasses human participants . The research protocol underwent thorough scrutiny and received endorsement from the Health Research Ethics Commission (HREC) at Dr. Moewardi General Hospital, Surakarta, Indonesia, reference No. 1190/UN27.06/PT.01.04/2024.

RESULTS

1. Sample Characteristics

It consists of the 60 potential subjects who met the inclusion criteria, 60 subjects successfully completed the study (response rate 100%) (see Table 1).

Table 1. Sample characteristics Duration vs Discipline: Uncovering Therapy Adherence Antiretrovirals in People with HIV

Characteristics	n	%
Age		
Teens	4	6.7%
Early Adulthood	25	41.7%
Late Adulthood	31	51.7%
Education		
Elementary	9	15.0%
Junior High school	9	15.0%
Senior High School	29	48.3%
Barchelor	13	21.7%
Type of Medicine		
Duvinavir	12	20.0%
TLD	21	35.0%
TLE	26	45.0%

The predominant demographic of individuals diagnosed with HIV was represented by those in the late adulthood bracket (ages 36-45), constituting 51.7% of the population, whereas the least represented group was adolescents (ages 18-20), accounting for 6.7%. The early adulthood category (ages 21-35) comprised 41.7% of the cohort. In terms of educational attainment among HIV patients, the majority had completed senior high school (48.3%), followed by those who attended college (21.7%), with a smaller proportion having completed elementary or junior high school (15.0%),

respectively. The primary antiretroviral medication utilized by the HIV patient cohort was Tenofovir-Lamivudine-Entricitabine (TLE), which constituted 45.0%, followed by Tenofovir-Lamivudine-Dolutegravir (TLD) at 35.0%, and lastly, Darunavir, which accounted for 20.0%.

2. Bivariate Analysis

The association between the duration of antiretroviral therapy and adherence to such treatment in individuals diagnosed with HIV was assessed utilizing the Spearman correlation test, given that the research data consists of numeric variables (duration of therapy) in contrast to ordinal categorical variables (adherence). The findings pertaining to the relationship between the duration of therapy and adherence to antiretroviral therapy among HIV patients are presented in Table 2 as follows.

Table 2. Correlation between the compliance and duration of therapy ARV

Compliance	N	Duration of Therapy (years)		r	P
		Mean	SD		
Low	21	3.38	3.14	0.42	0.001
Medium	10	6.60	2.55		
High	29	6.86	3.62		

Based on the data presented in the table 2, it is observed that among the cohort of 21 patients exhibiting low adherence. The mean duration of therapy was (Mean= 3.38 years; SD= 3.14). Conversely, among the 10 patients categorized with moderate adherence, the mean duration of therapy was (Mean= 6.60 years; SD= 2.55). As many as 29 patients demonstrating high adherence, the mean duration of therapy was (Mean= 6.86 years; SD= 3.62).

Pearson correlation showed that there was a positive and statistically significant correlation between the duration of therapy and adherence to antiretroviral therapy in individuals living with HIV (r= 0.42; p= 0.001).

DISCUSSION

The outcomes of this investigation revealed a noteworthy positive correlation between the length of antiretroviral (ARV) therapy and the adherence levels among patients diagnosed with HIV. Spearman correlation analysis produced a coefficient of r=0.415 (p=0.001), signifying a moderate strength of association. This observation suggests that an extended duration of ARV therapy is associated with an increased level of patient adherence.

a. Demographic Characteristics and Adherence

A predominant proportion of participants was situated within the late adult age category (36-45 years), constituting 51.7% of the sample. This demographic cohort demonstrates a superior level of adherence in comparison to other age brackets. Such a phenomenon can be elucidated by the fact that late adults typically exhibit enhanced psychological maturity and a greater sense of responsibility in managing their health. This observation aligns with the findings of Sari et al., which indicated that individuals aged 34-46 years exhibited the highest levels of adherence (Rahmadani et al., 2017; Sari et al., 2019).

The educational attainment of the respondents predominantly encompassed high school graduates (48.3%) and individuals with college education (21.7%). Subgroup analyses indicated a positive correlation between elevated levels of education and improved adherence (p=0.038). A higher

educational background facilitates a more comprehensive understanding of the disease and underscores the significance of treatment adherence. This finding align with previous study that identifies educational attainment as an independent predictor of adherence to ARV therapy (Habibi *et al.*, 2020; Rahmadani *et al.*, 2017).

Factors influencing the relationship between length of therapy and adherence: were (1) adaptation and experience. Patients who have engaged in long-term therapy generally exhibit greater adaptability in managing side effects and treatment-related challenges. The cumulative experience of navigating various obstacles during therapy cultivates more effective coping mechanisms (Kheswa, 2017; Kim et al., 2018; Rahmadani et al., 2017). This assertion is supported by the observation that the cohort demonstrating high adherence. (2) Social support and health services. An extended duration of therapy fosters improved relationships with healthcare systems and social support networks. RSUD Dr. Moewardi provides a comprehensive service infrastructure, encompassing continuous counseling that enhances patient understanding and motivation. (3) awareness and perception. Patients undergoing therapy for prolonged periods typically exhibit heightened awareness of the benefits associated with treatment, as informed by their personal experiences. They are able to directly perceive the positive influence of adherence to therapy on their quality of life (Wulandari et al., 2021; Sari et al., 2019).

This study found that the lowest adherence rate was in the group with a therapy duration of 1-2 years (35.0%). The initial phase of therapy is a critical period as patients face various challenges, i.e adjustment to treatment routine, significant drug side effects, stigma and psychosocial stress, HIV status acceptance process.(2). Psychosocial Factors Although length of therapy is positively correlated with adherence, some psychosocial factors remain a challenge: Long-term treatment saturation, Ongoing community stigma, Economic pressure for lifelong treatment, Fluctuating social support.(3). Healthcare System Several aspects of the healthcare system can influence adherence: Access to health facilities, availability of medicine, counseling quality, continuity of service, health service related costs (Agustin Wulandari *et al.*, 2021; Nuraidah & Wanda, 2022).

b. Clinical Implications

A multitude of strategies may be adopted: augmentation of support services during the initial phases of therapy, continuous educational initiatives throughout the entirety of the therapeutic process, modification of counseling methodologies contingent upon the duration of therapy, and the formation of peer support networks predicated on therapeutic experience (Pratiwi *et al.*, 2019).

In conslusion this study provides critical insights into the complex relationship between antiretroviral therapy duration and patient adherence. The findings underscore the importance of comprehensive, sustained support for HIV patients, particularly during the early stages of treatment. By recognizing the dynamic factors influencing medication adherence, healthcare providers can develop more targeted interventions to improve patient outcomes, ultimately enhancing the quality of life for individuals living with HIV. The research highlights that adherence is not a static phenomenon but a dynamic process influenced by multiple personal, social, and systemic factors. As such, a holistic, patient-centered approach that considers the unique journey of each individual

undergoing ARV therapy is essential for long-term treatment success.

RECOMMENDATIONS FOR FURTHER RESEARCH

Engage in prospective cohort studies to evaluate causal associations, employing diverse methodologies in adherence measurement, augment the quantity of samples and research sites, devise and evaluate the efficacy of intervention programs predicated on therapy duration, and formulate a predictive model for adherence.

AUTHORS CONTRIBUTION

All authors have contributed in writing this article.

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CONFLICT OF INTEREST

The authors assert that the research was executed devoid of any commercial or financial affiliations that may be interpreted as a possible conflict of interest.

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