



The Relationship between Knowledge and Family Support towards Medication Adherence among People Living with HIV (PLHIV): A Cross-Sectional Study

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ABSTRACT

Background: Appropriate knowledge about Human Immunodeficiency Virus is critical for preventing transmission and managing the disease. Lack of knowledge can seriously hinder treatment adherence. Family support is also crucial, as emotional and practical assistance from families improves psychological well-being, motivation, and creates a supportive environment for acceptance of the condition. **Purpose:** This study explores the association between knowledge and family support towards medication adherence among people living with HIV. **Methods:** An observational cross-sectional design was used. A total of 150 HIV patients from two public health centers were selected using convenience sampling. Data was collected using the demographics questionnaire, the Indonesian version of the HIV Knowledge Questionnaire (HIV-KQ18), the Family Support Scale, and the Morisky Medication Adherence Scale (MMAS), and analyzed using Sommer test correlation. **Results:** A weak significant relationship was found between knowledge and medication adherence ($p = 0.003$; contingency coefficient = 0.231). Similarly, family support had a weak significant association with medication adherence ($p = 0.0001$; contingency coefficient = 0.327). **Conclusion:** This study identified weak significant links between knowledge and medication adherence, and between family support and medication adherence. **Implications for Nursing:** Nurses should routinely assess HIV knowledge and family support to provide tailored education and family-inclusive care. Nursing programs, future research, and healthcare policies must prioritize family-centered approaches and nurse-led support initiatives to improve medication adherence.

Keywords: Family support, HIV, Knowledge, Medication adherence.

What does this paper add?

1. This study contributes to existing research by analysing both HIV-related knowledge and family support linked to medication adherence among PLHIV in Indonesia.
2. This study offers context-specific evidence from Central Java, Indonesia.
3. The results of this study will help healthcare

providers understand the relationship between HIV-related knowledge, family support and medication adherence among PLHIV.

Introduction

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) remain major global public health challenges that require

comprehensive management beyond biomedical treatment alone. Adherence to antiretroviral therapy (ART) is a critical determinant of successful HIV management, as it is strongly associated with improved clinical outcomes and reduced disease progression (Achappa et al., 2013; Hansana et al., 2013). This adherence is influenced by multiple factors, particularly patients' knowledge and the support that they receive from their families. Adequate knowledge helps individuals understand disease progression, treatment benefits, and the importance of consistent medication use, thereby promoting more proactive health behaviours (Etoom et al., 2025; Safitri et al., 2023).

Medication adherence among PLHIV in Indonesia remains a critical concern. National data of Indonesia shows that only 55% of those on antiretroviral therapy achieve viral suppression, and studies in Central Java report adherence rates of 59% (Kemenkes, 2025). These statistics highlight the urgent need to examine factors, such as HIV knowledge and family support, to improve adherence outcomes.

Nurses play a crucial role in the care of HIV patients, including understanding and managing the relationship between knowledge, family support, and medication adherence. In nursing practice, nurses are at the forefront of providing holistic, patient-focused care (Devi Nr et al., 2023; Wedajo et al., 2022). As direct implementers of care, nurses are uniquely positioned to monitor and evaluate patients' knowledge of HIV/AIDS, detect the level of family support received by patients, and understand their level of medication adherence (Fatoni et al., 2016; Perazzo et al., 2018). Nurses can play a role in providing accurate information and supporting patients and their families in the care and decision-making process (Arends et al., 2022).

The presence of nurses in the care of HIV patients can help create a supportive and safe environment for patients to share their knowledge and experiences, and identify potential barriers to family support and treatment adherence (Davoudi et al., 2023; Mujayanto et al., 2024). Previous research emphasized the important role of nurses in supporting patients and their families, with a particular emphasis on providing appropriate education and supporting treatment adherence (Etoom et al., 2025; Malkawi et al., 2024). With an in-depth understanding of the factors influencing adherence and family support, nurses can shape customized interventions according to patients' needs, creating

effective and patient-centred care.

In addition, family support plays a crucial role by providing emotional, social, and practical reinforcement that can enhance patients' motivation to adhere to treatment. However, stigma, discrimination, and variations in family dynamics may limit the effectiveness of such support (Hu et al., 2025). Previous studies have reported inconsistent findings regarding the extent to which family support influences adherence, suggesting the importance of contextual and cultural factors (Nabunya et al., 2023). Therefore, further investigation is needed, particularly in the Indonesian context, to better understand how knowledge and family support interact in shaping medication adherence among people living with HIV.

The aim of this study was to explore the association between HIV-related knowledge and medication adherence among PLHIV in Central Java, Indonesia. Furthermore, the study also examined the relationship between family support and medication adherence in this population.

Methodology

Study Design

The explanatory cross-sectional design is warranted, as the research question concerns the identification of associations among knowledge, family support, and adherence, rather than causal inference. This methodology facilitates the simultaneous measurement of all variables at one-time point, reduces participant burden, and provides a robust framework for testing statistical relationships. This study was reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cross-sectional studies.

Setting

Data was collected at two public health centers in Semarang City, Central Java, Indonesia, between July and September 2025. The first health center, Puskesmas Poncol, is located in northern Semarang City and is recognized as a pioneer facility with a comprehensive HIV program unit offering both screening and treatment. The second health center, Puskesmas Kedungmundu, is situated in eastern Semarang City and is known for its well-managed antiretroviral therapy (ARV) services. These two public health centers were selected purposively based on: (1) having the highest

number of registered PLHIV under care in Semarang City, (2) offering comprehensive HIV services, (3) representing both urban and peri-urban geographic areas, and (4) feasibility of access and prior collaborative relationships.

Population and Sampling Technique

This study's target population was all people living with HIV (PLHIV) receiving antiretroviral therapy (ART) in Semarang City, Central Java, Indonesia. The accessible population, from which the sample was drawn, consisted of all PLHIV who were active ARV patients at the two selected public health centers during the data collection period. Convenience sampling technique was employed to ensure that selected participants possessed the specific characteristics necessary to provide the required information. Using G*Power with parameters of medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and power = 0.80, we determined that the minimum sample size should be 127 participants. To account for an anticipated 15% attrition or incomplete data, we inflated the sample to 150 participants, which maintains adequate statistical power.

Inclusion Criteria

The primary inclusion criteria were: (1) a confirmed diagnosis of HIV, (2) being an active ARV patient at one of the two public health centers in Central Java, Indonesia, (3) willingness to participate by signing an informed consent form, and (4) the capability to read and write to ensure that they could independently complete the research questionnaire. Participants were recruited on-site during their routine visits for ARV refills or clinical check-ups. The researchers approached eligible individuals, explained the study's purpose, and invited those who met the inclusion criteria to participate.

Exclusion Criteria

Participants were excluded if they were under 18 years of age, had been on ART for less than three months, had severe psychiatric or cognitive impairments, were critically ill or hospitalized, or declined to provide a written informed consent.

Data Collection Procedure

The survey used Online Forms with enhanced privacy protections. After obtaining face-to-face consent, the researchers displayed a unique QR code on

a printed card, which participants scanned with their smartphones to reach a password-protected link. The link was not shared via email or messaging apps to ensure confidentiality. Participants completed the form independently in the private consultation room, taking 15-20 minutes. Responses were automatically encrypted and stored in a password-protected Google account accessible only to the principal researcher, with no duplicate submissions allowed from the same device. Those with technical difficulties were immediately offered a paper alternative.

Data Collection Tool

A demographics questionnaire was administered to collect data on participants' age, gender, educational attainment, and employment status.

This study utilized the Indonesian version of the HIV Knowledge Questionnaire (HIV-KQ18). The validity test for the HIV-KQ18 yielded an R-value ranging from 0.177 to 0.564, which is greater than the r-table value of 0.112. The reliability test resulted in a Cronbach's alpha of 0.763 (Kurniawan et al., 2022).

The Indonesian version of the Family Support Scale (FSS) was employed to assess family support. This scale has been tested for validity and reliability, achieving a Cronbach's alpha score of 0.953. The validity test results produced an r-value ranging from 0.420 to 0.717 (Santika & Mariyati, 2023).

The Indonesian version of the Morisky Medication Adherence Scale (MMAS) was utilized to assess medication adherence. This scale has undergone evaluation for both validity and reliability, resulting in a Cronbach's alpha score of 0.787. The validity test results showed an r-value ranging from 0.305 to 0.860 (Vika et al., 2016).

Ethical Considerations

The research was granted ethical approval by the Health Research Ethics Commission at the Faculty of Nursing, Universitas Islam Sultan Agung, under ethical certificate 920/A.1/KEPK-FIK-SA/VI/2025. To ensure data security, only the principal researcher had access to the raw data, and survey links were not shared outside the research team. All data was stored on a password-protected, encrypted computer, and the data will be retained for five years after the study concludes, after which it will be permanently deleted. Participants were clearly informed that their involvement was entirely

voluntary and that they could withdraw at any time without any consequences to their ongoing care. To protect privacy and confidentiality, no personal identifiers were collected and HIV status was kept strictly confidential.

Data Analysis

Data analysis was conducted using a univariate approach, employing frequency distribution tables for each variable in the study, which included the independent variables (knowledge and family support) and the dependent variable (medication adherence). Respondent characteristics, such as age, gender, education, and occupation, were also analyzed. Subsequently, a bivariate analysis was performed to examine the relationships between the dependent and independent variables using the Sommer test, with a

significance level set at 5%. The analysis was carried out using SPSS, version 23.

Results

The average age of respondents was 31.75 years, with the youngest being 19 and the oldest 48. Most respondents were male, totalling 104 individuals (69.3%). In terms of education, the majority had completed senior high school, with 95 respondents (63.3%). The most common occupation among respondents was labourer, accounting for 62 individuals (41.3%). Regarding knowledge, a significant number of respondents (82 or 54.7%) demonstrated high levels of knowledge. Additionally, 70 respondents (46.7%) reported having high levels of family support. Finally, the majority of respondents (87 or 58.0%) adhered to their antiretroviral medication regimen (Table 1).

Table 1. Participants' demographic and variables' description (n=150)

Variable	Mean±SD	Median	Minimum-Maximum
Age	31.75±6.28	32.00	19-48
Variables	Categories	Frequency	Percentage
Gender	Male	104	69.3
	Female	46	30.7
	Total	150	100
Education	Elementary School	5	3.3
	Junior High School	28	18.7
	Senior High School	95	63.3
	Undergraduate	22	14.7
	Total	150	100
Job	Housewife	16	10.7
	Labourer	62	41.3
	Employee	58	38.7
	Civil Servant	14	9.3
	Total	150	100
Knowledge	Low	19	12.7
	Moderate	49	32.6
	High	82	54.7
	Total	150	100
Family Support	Low	19	12.6
	Moderate	61	40.7
	High	70	46.7
	Total	150	100
Medication adherence	Disobey	63	42.0
	Obey	87	58.0
	Total	150	100

The study found a significance value of 0.003 ($p < 0.05$), indicating a significant correlation between knowledge and medication adherence among people

living with HIV (PLHIV). The correlation value of 0.231 suggests a positive relationship, albeit with a weak correlation (Table 2).

Table 2. Relationship between knowledge and medication adherence (n=150)

		Medication Adherence
Knowledge	r	0.231
	p-value	0.003
	n	150

* Sommer test, $p < 0.05$ shows statistical significance.

The study results revealed a significance value of 0.0001 ($p < 0.05$), indicating a significant correlation between family support and medication adherence among people living with HIV (PLHIV). The correlation value of 0.327 suggests a positive relationship, although it is considered weak (Table 3).

Table 3. Relationship between family support and medication adherence (n=150)

		Medication Adherence
Family Support	r	0.327
	p-value	0.0001
	n	150

* Sommer test, $p < 0.05$ shows statistical significance.

Discussion

The results indicate that most individuals with HIV possess high or excellent levels of knowledge about their condition, attributed to several factors. First, after receiving an HIV diagnosis, many individuals actively seek comprehensive information about HIV/AIDS to better understand and manage their health. They enhance their understanding through consultations with healthcare professionals, participation in support groups, and various informational resources (Shrestha et al., 2023). Additionally, a sense of personal responsibility may motivate individuals to seek knowledge as a means of taking control of their health and future. Many people living with HIV are also driven by a desire to protect their loved ones by learning how to prevent onward transmission, manage side effects, and maintain treatment adherence (Kusuma et al., 2020). Consequently, the high levels of knowledge among people with HIV reflect their proactive efforts to understand and cope with their condition.

Family support was also found to be high or excellent. This result is possible, because a diagnosis of HIV often triggers a strong emotional response from the

family, which can lead to greater understanding, support, and care for individuals affected by HIV. The crisis of a serious health diagnosis may strengthen family bonds and activate caregiving responsibilities, driven by cultural norms of mutual support and collective coping. Many families become more cohesive when facing a health challenge, as they recognize the tangible benefits of providing emotional and practical assistance. Furthermore, support from families can be instrumental in promoting the psychological and physical well-being of people with HIV, helping them overcome the daily challenges faced in managing their condition and maintaining adherence to necessary treatment regimens.

The findings showed that the majority of people with HIV were adherent to antiretroviral treatment. Awareness of the importance of adherence to antiretroviral therapy to manage HIV and prevent the progression of the disease to AIDS has increased significantly in recent years. More comprehensive information about the benefits of antiretroviral treatment and its positive impact on quality of life and life expectancy has helped increase individuals' motivation to remain adherent to their treatment regimen (Sakthivel et al., 2020). Developments in antiretroviral drug formulations that are more effective and have fewer side effects have also contributed to higher adherence rates. More accessible and manageable treatments, such as once-daily medication or combination formulations, facilitate adherence to long-term therapy (Pertiwi et al., 2020; Supriyatni et al., 2023). In addition, support from medical personnel and family in motivating and supporting individuals undergoing antiretroviral treatment also plays an important role in increasing adherence rates (Rouleau et al., 2019). We revealed that the results of the study show that the majority of people with HIV are adherent to antiretroviral therapy, which reflects the importance of collaborative efforts between individuals, medical personnel, and social support in managing HIV effectively.

Results showed a significant association between knowledge and adherence to antiretroviral treatment in people with HIV. Adequate knowledge about HIV disease and treatment can help individuals understand the importance of adherence to their treatment regimen (Ramirez-Garcia & Côté, 2009). When an individual has good knowledge about how the virus works in the body and how antiretroviral treatment helps control the

infection, he/she is likely to be more motivated to adhere to his/he treatment. In addition, good knowledge also allows individuals to recognize the importance of adhering to treatment schedules and managing drug side effects that may arise, thereby increasing their likelihood of staying on treatment consistently (Amal et al., 2024; Joves et al., 2023). There was also a weak association between knowledge and antiretroviral treatment. While a person may have a good understanding of the disease and its treatment, individual factors can affect adherence, such as psychological issues, financial limitations, or other practical aspects that make it challenging to fulfil prescriptions and take medications regularly (Sakthivel et al., 2020). In addition, knowledge alone does not always guarantee motivation or ability to take medication consistently. Some people may have adequate knowledge, but still feel stressed or insecure about their treatment.

The results also found a correlation between family support and antiretroviral treatment adherence. Family support is essential in motivating and supporting individuals to adhere to their treatment regimen. When individuals feel supported by their family members, both emotionally and practically, they tend to feel more motivated and confident in their treatment (Olagbemide et al., 2021). Family support can also help enhance individuals' emotional security and confidence in managing their condition, reinforcing their ability to cope with daily treatment demands (Supriyatni et al., 2023). A weak correlation was also found in the results of this study. A weak correlation may be due to a lack of empathetic family support or internal conflict. In addition, a lack of understanding of the HIV condition may reduce the effectiveness of support in motivating treatment adherence.

Conclusion

This study identified a link between knowledge and medication adherence, as well as a relationship between family support and medication adherence. Future research should further investigate the interactions among knowledge, family support, and medication adherence, taking into account diverse populations and cultural contexts to better support individuals living with HIV.

Implications for Nursing

Given the strong link between medication adherence

and both HIV knowledge and family support, nurses need to regularly evaluate these factors, offer individualized education, and actively include family members in care to strengthen emotional and practical assistance. For example, a nurse-led "Family Adherence Support Session" could be implemented, consisting of a 60-minute structured home or clinic visit where the nurse educates both the patient and one designated family member about ARV regimens, side effect management, and the importance of consistent dosing, followed by collaborative development of a daily medication reminder system (such as shared phone alarms or a written schedule posted at home). Nursing education programs should incorporate family-centered approaches and communication skill-building, and future studies ought to create and evaluate family-focused strategies for improving adherence. Resources must be directed by healthcare policies toward nurse-led family support initiatives.

Strengths and Limitations

This study has several strengths. First, it examines both HIV-related knowledge and family support simultaneously, providing a more comprehensive understanding of factors influencing medication adherence among people living with HIV (PLHIV), rather than assessing these variables in isolation. Second, the use of standardized and validated instruments; namely, HIV-KQ18, Family Support Scale (FSS), and Morisky Medication Adherence Scale (MMAS), enhances the reliability and validity of the findings. Third, the study provides context-specific evidence from Central Java, Indonesia, which is important given the influence of cultural and social factors on family dynamics and health behaviours.

However, this study is limited by its inability to fully capture the complexity of family support, including the distinction between positive and negative interactions. Other limitations include the use of convenience sampling, recruitment from only two public health centers, and the employment of self-structured questionnaires, which may introduce subjectivity and recall bias, thereby limiting the generalizability of the findings.

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Conflict of Interests

The authors declare no conflict of interests.

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Author Contributions

Study Design: **AIA**. Data Collection: **RS, MAN**. Data Analysis: **AIA**. Study Supervision: **MAUS**. Manuscript Writing: **AIA, MAN**. Critical Revision for Important Intellectual Content: **AIA, MAUS, RS**.

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