

Original Research Paper

Factors associated with lost to follow-up behavior among HIV/AIDS patients undergoing ARV therapy

Ricki Hendri Yudiawan*, Nova Mega Rukmana, Nana Novariana

Department of Public Health, Faculty of Health, Universitas Mitra Indonesia, Indonesia

 rickyawan30@gmail.com

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Abstract

At Puskesmas (Primary Health Center) Madukoro, in May 2024, it was found that out of 46 patients undergoing antiretroviral (ARV) therapy, 10 had a history of lost to follow-up behavior, either temporarily or permanently. This represents 21.7% of patients lost to follow-up, based on the total number of patients who had ever received ARV treatment. This figure exceeds the World Health Organization (WHO) standard, which states that no more than 20% of patients should be lost to follow-up within one year. This study aims to identify the factors influencing lost to follow-up behavior among HIV/AIDS patients undergoing ARV therapy at Madukoro Public Health Center, North Lampung Regency. A descriptive-analytic design was used, employing a quantitative research method with a cross-sectional approach. The study population consisted of all 46 HIV/AIDS patients at the health center receiving ARV treatment, with total sampling applied. The findings revealed a significant relationship between perceived vulnerability and lost to follow-up behavior ($p = 0.000$), perceived severity and lost to follow-up behavior ($p = 0.000$), and perceived barriers and lost to follow-up behavior ($p = 0.001$). However, there was no significant relationship between perceived benefits and lost to follow-up behavior ($p = 0.169$). There was also a significant relationship between self-efficacy and lost to follow-up behavior ($p = 0.001$), as well as between environmental support and lost to follow-up behavior ($p = 0.000$). It is recommended that the Head of Madukoro Public Health Center disseminate the results of this study to the staff responsible for the HIV P2 Program, healthcare workers, and other employees in order to develop appropriate strategies or work programs to prevent lost to follow-up cases among HIV/AIDS patients.

Keywords: ARV therapy; health belief model (HBM); HIV/AIDS patients; lost to follow-up behavior

1. Introduction

The Human Immunodeficiency Virus (HIV) is a virus that leads to Acquired Immunodeficiency Syndrome (AIDS). This virus attacks the immune system, diminishing the body's capacity to combat illnesses. The presence of HIV in the body leads to an immunodeficiency. HIV specifically targets and impairs essential elements of the immune system, notably CD4-positive T cells (CD4+), commonly referred to as helper T cells. These cells are a category of leukocytes that are essential in combating infections. The virus also eradicates macrophages and dendritic cells, resulting in a reduced ability of the body to fight infections and specific cancers (Sitorus, 2022).

In December 2022, Bandar Lampung city in Lampung Province reported the greatest number of individuals living with HIV (PLHIV), totaling 1,265. Subsequently, South Lampung Regency recorded 509 inhabitants, followed by East Lampung Regency with 219, Pringsewu Regency with 205, Metro City with 201, and Central Lampung Regency with 197. Additionally, Tulang Bawang Regency reported 81 people, while North Lampung Regency ranked seventh with 80 PLHIV. Subsequent to that, Tulang Bawang Barat Regency recorded 59 people, Tanggamus Regency 43, and Way Kanan Regency had the lowest count, with merely 8 individuals (Rilis Lampung, 2023).

A significant advancement in the medical domain for inhibiting HIV virus replication is the

administration of antiretroviral (ARV) medicines, which require consistent intake. Compliance with antiretroviral therapy is a crucial approach for extending the lifespan of HIV/AIDS patients. Adherence to ARV therapy ensures the drug's efficacy within the body, thereby avoiding or mitigating the advancement of the virus. Although antiretroviral therapy (ARV) does not eradicate HIV from the body, it can inhibit its replication. "Lost to follow-up refers to a patient's failure to attend scheduled VCT (VCT) services for evaluations and medication collection. Another meaning of "lost to follow-up" encompasses the absence of two or three scheduled appointments, neglecting to attend the final appointment within a 2 to 4-week period, or failing to attend follow-up visits for over three months. This conduct may yield significant adverse effects on treatment efficacy, as antiretroviral (ARV) therapy is designed not to eradicate HIV but to enhance the quality of life for individuals infected, diminish the risk of transmission to others, and reduce the prevalence of AIDS and AIDS-related death (Berlianty, 2018).

The factors that influence lost to follow-up behavior in HIV/AIDS patients can be analyzed using the Health Belief Model (HBM). This paradigm asserts that a person's views of their condition affect their health practices. The approach emphasizes subjective perceptions, encompassing perceived vulnerability, perceived severity, perceived rewards, perceived barriers, cues to action, and self-efficacy. These beliefs are regarded as potential determinants of self-acceptance in individuals with HIV. Prior research has demonstrated that perceived vulnerability, perceived severity, perceived barriers, and cues to action are substantially correlated with lost to follow-up behavior in HIV patients receiving ARV medication. Nonetheless, perceived benefits and self-efficacy were not identified as having significant correlations (Manowati, 2019). In May 2024, at *Puskesmas* Madukoro, 10 out of 46 patients receiving ARV treatment were recognized as having a history of lost to follow-up behavior, either temporarily or permanently. This represents 21.7% of patients who were lost to follow-up, relative to the total number of patients who had previously received ARV treatment. This figure surpasses the WHO norm, which stipulates that no more than 20% of patients should miss follow-up appointments within a year. This study aims to evaluate the factors associated with lost to follow-up behavior among HIV/AIDS patients receiving antiretroviral (ARV) therapy at *Puskesmas* Madukoro, North Lampung Regency, in 2024.

2. Research Methods

This study employed a quantitative approach with a descriptive-analytic design using a cross-sectional method. The research was conducted at *Puskesmas* Madukoro from July 10 to July 24, 2024. The study population comprised all HIV/AIDS patients aged 17 years and older receiving ARV treatment at the health center, totaling 46 persons, irrespective of gender. The employed sample technique was complete sampling. The independent variables in this study comprised perceived susceptibility, perceived severity, perceived advantages, perceived barriers, self-efficacy, and environmental support, whereas the dependent variable was the behavior of lost to follow-up. Primary data were acquired by direct observations and questionnaire responses from individuals, utilizing structured statements. Secondary data were acquired from the health center's profile and additional supporting sources, including WHO statistics, Ministry of Health rules, HIV prevention technical recommendations, pertinent reference texts, and prior related studies. The data was gathered through a questionnaire. Validity and reliability testing was conducted at the *Puskesmas* Ketapang in North Lampung Regency on June 3, 2024, revealing that all items in the questionnaire were both valid and reliable. Univariate analysis was employed to delineate the attributes of each variable utilizing categorical data represented by frequencies and percentages. Bivariate analysis was employed to investigate the correlation between independent and dependent variables. The Chi-Square (X^2) test was employed to compare observed and predicted frequencies to ascertain significant differences, given that

the data utilized in this investigation were categorical (nominal or ordinal).

3. Result and Discussion

3.1. Univariate Analysis

Based on Table 1 in the univariate analysis, the frequency distribution of respondents according to perceived susceptibility toward lost to follow-up behavior among HIV/AIDS patients shows that the majority had a moderate level of perception, with 31 respondents (67.4%). A related study by Manowati (2019) on factors influencing lost to follow-up among HIV/AIDS patients undergoing ARV therapy at *RSUD* (Regional General Hospital) Dr. Soetomo also reported a distribution of perceived susceptibility with 10% in the low category, 46% moderate, and 44% high. In that study, the largest group of respondents also had a moderate level of perceived susceptibility. Perceived susceptibility refers to an individual's subjective perception of the risk associated with their health condition. In medical contexts, this dimension involves acceptance of the diagnosis, personal estimation of potential resusceptibility, and general susceptibility to illness (Manowati, 2019).

The frequency distribution of respondents for perceived severity of lost to follow-up behavior among HIV/AIDS patients indicates that the majority exhibited a moderate degree of perception, with 26 respondents (56.5%). In a pertinent study conducted by Manowati (2019) regarding the determinants of lost to follow-up among HIV/AIDS patients receiving ARV therapy at *RSUD* Dr. Soetomo, the distribution of perceived severity was as follows: 7% low, 68% moderate, and 25% high. Perceived severity denotes an individual's assessment of the seriousness of a disease, encompassing an evaluation of potential clinical and medical consequences (e.g., mortality, disability, and illness), alongside possible social consequences (e.g., impact on employment, family life, and social relationships) (Manowati, 2019).

The frequency distribution of respondents based on perceived benefits toward lost to follow-up behavior among HIV/AIDS patients shows that the majority had a high level of perception, with 26 respondents (56.5%). In a related study by Manowati (2019) on factors influencing lost to follow-up among HIV/AIDS patients undergoing ARV therapy at *RSUD* Dr. Soetomo, the distribution of perceived benefits was 28% low, 47% moderate, and 25% high. In that study, most respondents had a moderate perception of benefits. Perceived benefits refer to an individual's belief in the advantages they gain when practicing positive health behaviors. This positive attitude plays an important role in influencing individuals to make healthy decisions for themselves and their environment (Pakpahan et al., 2021).

The frequency distribution of respondents based on perceived barriers toward lost to follow-up behavior among HIV/AIDS patients shows that the majority had a moderate level of perception, with 27 respondents (58.7%). Perceived barriers refer to the obstacles an individual perceives when considering behavior change or the difficulties encountered in taking action (Manowati, 2019). In a related study by Manowati (2019) on factors influencing lost to follow-up among HIV/AIDS patients undergoing ARV therapy at *RSUD* Dr. Soetomo, the distribution of perceived barriers was 11% low, 67% moderate, and 22% high. Similar to the current study, the highest proportion of respondents in that research also reported a moderate level of perceived barriers.

The frequency distribution of respondents regarding self-efficacy related to loss to follow-up behavior among HIV/AIDS patients indicates that 23 respondents (50%) exhibited high self-efficacy. Self-efficacy denotes an individual's conviction in their capacity to execute a particular behavior, such as sustaining health motivation. This concept pertains to an individual's incentive to maintain a healthy lifestyle, encompassing control over one's health status and the significance attributed to health (Manowati, 2019). In a pertinent study conducted by Manowati (2019) regarding factors affecting lost

to follow-up among HIV/AIDS patients receiving ARV therapy at *RSUD* Dr. Soetomo, the distribution of self-efficacy levels was 19% low, 52% moderate, and 29% high.

The frequency distribution of respondents regarding environmental support related to lost to follow-up behavior among HIV/AIDS patients indicates that the majority, 25 respondents (54.3%), experienced moderate environmental support. Environmental support denotes influences that operate as prompts for individuals to engage in particular actions or behaviors. These cues may originate from both internal and external factors, including mass media messages, counsel or support from friends or family, and sociodemographic elements such as educational attainment, living conditions, parental oversight, peer relationships, religious beliefs, ethnicity, and socioeconomic and cultural contexts (Manowati, 2019). In a pertinent study conducted by Manowati (2019) regarding factors affecting loss to follow-up among HIV/AIDS patients receiving ARV therapy at *RSUD* Dr. Soetomo, the environmental support distribution was categorized as 17% low, 45% moderate, and 38% high, with the majority of respondents classified within the moderate category.

Table 1. Univariate Analysis

No.	Variable	Frequency	Percentage (%)
1	Perceived Susceptibility		
	Low	1	2.2
	Moderate	31	67.4
	High	14	30.4
	Total	46	100
2	Perceived Severity		
	Low	2	4.3
	Moderate	26	56.5
	High	18	39.1
	Total	46	100
3	Perceived Benefits		
	Low	0	0
	Moderate	20	43.5
	High	26	56.5
	Total	46	100
4	Perceived Barriers		
	Low	0	0
	Moderate	27	58.7
	High	19	41.3
	Total	46	100
5	Self-Efficacy		
	Low	0	0
	Moderate	23	50
	High	23	50
	Total	46	100
6	Environmental Support		
	Low	4	8.7
	Moderate	25	54.3
	High	17	37.0
	Total	46	100

3.2. Bivariate Analysis

Table 2 presents the results of a bivariate analysis using the chi-square test, which indicates a statistically significant association ($p\text{-value} = 0.000$; $OR = 4.33$) between perceived susceptibility and

lost to follow-up behavior among HIV/AIDS patients undergoing antiretroviral therapy (ART) at Madukoro Community Health Center. These findings are consistent with a study by Tri Rahayu Adhaningrum (2018), titled *The Relationship Between Demographics, Perceived Susceptibility, and Perceived Severity of Illness and Medication Adherence Among Hypertensive Patients at Puskesmas Pandanwangi*. Her research revealed a significant relationship between perceived susceptibility and medication adherence among hypertensive patients in the *Puskesmas Pandanwangi* service area, with a Spearman correlation value of 0.001, indicating a weak but positive correlation. The study found that patients who perceived hypertension as a serious condition that could lead to severe complications were more likely to adhere to their prescribed treatments. Similarly, HIV patients who perceived themselves as highly susceptible to complications were more likely to adhere to their therapy and had a lower incidence of *lost to follow-up*. Conversely, patients who underestimated their risk or did not perceive themselves as vulnerable were more likely to discontinue treatment (Reynolds, N. R., 2009).

The chi-square test results in Table 2 demonstrate a statistically significant relationship between perceived severity and *lost to follow-up* behavior among HIV/AIDS patients receiving antiretroviral medication (ART) at *Puskesmas Madukoro* (p -value = 0.000). The odds ratio (OR) was determined to be 20.42, indicating that respondents with a diminished impression of disease severity were 20.42 times more likely to demonstrate *lost to follow-up* behavior than those with an elevated assessment of severity. Patients who recognize HIV as a grave and potentially fatal condition are more likely to adhere to treatment and therapy regimens regularly. A diminished awareness of the disease's severity may result in a lack of motivation to persist with therapy (Wahyuni, 2023). This conclusion is corroborated by a prior study conducted by Manowati (2019), which investigated the determinants of *lost to follow-up* among HIV/AIDS patients undergoing ART at Dr. Soetomo Regional General Hospital. The statistical study employing Spearman's rho revealed a significant correlation ($p = 0.025$) between perceived severity and *lost to follow-up* behavior at the PIPI Clinic, Dr. Soetomo Regional General Hospital, Surabaya. Despite the small association ($r = 0.224$), it was positive, suggesting that a patient's heightened awareness of sickness severity correlates with an increased likelihood of adhering to treatment and avoiding *lost to follow-up* behavior.

The results of the chi-square statistical test indicate no significant relationship between perceived benefits and *lost to follow-up* behavior among HIV/AIDS patients undergoing antiretroviral therapy (ART) at *Puskesmas Madukoro*, with a p -value of 0.169 and an odds ratio (OR) of 0.35. According to Ajzen (1991), in his Theory of Planned Behavior, in certain cases, other factors within the Health Belief Model (HBM), such as perceived barriers or perceived susceptibility, may play a more dominant role in influencing *lost to follow-up* behavior than perceived benefits. For instance, even if patients believe that antiretroviral therapy (ART) is beneficial, barriers such as stigma, physical discomfort, or logistical issues may exert a stronger influence on their decision to discontinue treatment. Belief in the benefits of engaging in health-promoting behavior is crucial, as it fosters a positive attitude that significantly affects human behavior in making healthy decisions for themselves and their surroundings. The greater the perceived benefits of prevention, the higher the likelihood that individuals will engage in preventive actions (Pakpahan et al., 2021).

The chi-square statistical test results exhibit a significant relationship (p -value = 0.001) between perceived barriers and *lost to follow-up* behavior among HIV/AIDS patients receiving antiretroviral medication (ART) at *Puskesmas Madukoro*. The odds ratio (OR) was 17.18, signifying that respondents with elevated perceived barriers were 17.18 times more likely to demonstrate *lost to follow-up* behavior than those with diminished perceived barriers. A pertinent study conducted by Manowati (2019) examined the factors affecting *lost to follow-up* among HIV/AIDS patients undergoing ART at UPIPI Polyclinic of RSUD Dr. Soetomo Surabaya, revealing a significant correlation ($p = 0.022$) between perceived barriers and *lost to follow-up* behavior, as determined by Spearman's rho statistical test.

Despite the weak correlation ($r = 0.228$), it was positive, signifying a parallel relationship between the two variables. Factors such as social stigma, transportation expenses, pharmaceutical adverse effects, and physical discomfort significantly influence lost to follow-up behavior. When patients assess these obstacles as surpassing the advantages of treatment, they are likely to cease care (Sartika & Apsari, 2024).

The results of the chi-square statistical test indicates a significant relationship ($p\text{-value} = 0.001$) between self-efficacy perception and lost to follow-up behavior among HIV/AIDS patients undergoing antiretroviral therapy (ART) at *Puskesmas* Madukoro. The odds ratio (OR) was 24.00, meaning that respondents with low self-efficacy were 24 times more likely to exhibit lost to follow-up behavior. Self-efficacy refers to an individual's belief in their ability to perform or carry out a specific behavior, such as health motivation, which includes personal motivation to maintain a healthy life, control over one's health condition, and valuing health itself (Manowati, 2019). It represents the confidence an individual has in their ability to take actions that lead to desired outcomes. These findings are consistent with a study by Novitasari (2017), which revealed a significant relationship between self-efficacy and medication adherence among tuberculosis patients at *Puskesmas* Patrang, Jember Regency, based on a $p\text{-value}$ lower than the alpha threshold. The present study assumes that respondents with high self-efficacy also exhibit consistent follow-up behavior. Most respondents believed strongly in the effectiveness of the ART they were undergoing, confident that it would improve their physical condition and make them appear healthier. As a result, they regularly attended follow-up treatment sessions at *Puskesmas* Madukoro.

The statistical analysis results utilizing the chi-square test reveal a significant relationship ($p\text{-value} = 0.000$) between environmental support and lost to follow-up behavior among HIV/AIDS patients receiving ARV therapy at *Puskesmas* Madukoro. An odds ratio (OR) of 2.68 indicates that respondents with low environmental support were 2.68 times more likely to demonstrate lost to follow-up behavior than those with high support levels. Environmental support denotes factors that operate as stimuli for individuals to engage in specific actions or behaviors. These cues may encompass both internal and external factors, including mass media messages, counsel from friends or family, sociodemographic elements such as educational attainment, geographic location, peer affiliations, religious beliefs, ethnicity, economic circumstances, and the social or cultural milieu (Manowati, 2019). A prior study conducted by Manowati (2019) examining factors contributing to lost to follow-up among HIV/AIDS patients undergoing ARV therapy at *RSUD* Dr. Soetomo revealed, via Spearman's rho test, a significant correlation ($p = 0.011$) between cues to action and lost to follow-up behavior at the PIPI Clinic of *RSUD* Dr. Soetomo, Surabaya. The statistical analysis revealed a negligible correlation ($r = 0.254$), with a positive correlation coefficient indicating a direct relationship between the two variables; specifically, an increase in stimuli or cues to action received by respondents during treatment correlates with improved follow-up behavior.

Table 2. Bivariate Analysis

No.	Independent Variable	Dependent Variable			Total	P value	OR
1.	Perceived Susceptibility	Poor	Fair	Good			
	Low	1	0	0	1	0.000	4.33
	Moderate	1	24	6	31		
	High	0	7	7	14		
	Total	2	31	13	46		
2.	Perceived Severity						
	Low	1	1	0	2	0.000	20.42
	Moderate	1	23	2	26		
	High	0	7	11	18		

No.	Independent Variable	Dependent Variable			Total	P value	OR
3.	Total	2	31	23	46	0.169	0.35
	Perceived Benefits						
	Low	0	0	0	0		
	Moderate	0	12	8	20		
	High	2	19	5	26		
4.	Total	2	31	13	46	0.001	17.18
	Perceived Barriers						
	Low	0	0	0	0		
	Moderate	2	23	2	27		
	High	0	8	11	19		
5.	Total	2	31	13	46	0.001	24.00
	Self-Efficacy						
	Low	0	0	0	0		
	Moderate	1	21	1	23		
	High	1	10	12	23		
6.	Total	2	31	13	46	0.000	2.68
	Environmental Support						
	Low	2	2	0	4		
	Moderate	0	19	6	25		
	High	0	10	7	17		
	Total	2	31	13	46		

4. Conclusion

The results of the chi-square test indicate significant relationships between perceived susceptibility, perceived severity, perceived barriers, self-efficacy, and environmental support with lost to follow-up behavior among HIV/AIDS patients undergoing ARV therapy at *Puskesmas* Madukoro. Nonetheless, no substantial correlation was identified between perceived advantages and attrition behavior in this demographic. Future researchers are urged to perform comprehensive interviews to investigate the fundamental reasons for lost to follow-up behavior among HIV/AIDS patients.

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