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Correlation of Self-Efficacy, Action Planning, and Coping Planning to ARV Adherence in HIV Patients in Ternate, Indonesia

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ABSTRACT

Introduction: HIV-positive patients require adherence to Antiretroviral therapy (ART) to control their disease. However, in Ternate City, ARV adherence remains low due to side effect fears, stigma, depression, and limited health service access. Therefore, this study analyzes the correlation between self-efficacy, action planning, and coping planning with ARV adherence in HIV-positive patients in Ternate City, North Maluku. **Method**: An observational, cross-sectional study used stratified random sampling of HIV-positive patients at five service centers, with data analyzed using the Spearman test. **Results**: Most respondents were aged 19-49 (94.9%), male (69.1%), held a high school education (57.3%), were self-employed (24.2%), and earned under 1 million rupiah per month (33.1%). Furthermore, self-efficacy (p=0.000; r=0.404), action planning (p=0.000; r=0.399), and coping planning (p=0.000; r=0.265) were significantly associated with ARV adherence. **Conclusion**: These findings suggest that self-efficacy, action planning, and coping planning benefit ARV adherence in HIV-positive patients.

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INTRODUCTION

HIV/AIDS is an infectious disease that has caused 40.4 million deaths since it was declared an epidemic. By the end of 2022, 39 million people worldwide were HIV-positive. Approximately 630,000 people worldwide had died from the disease (World Health Organization, 2023a). According to the WHO, HIV/AIDS is the second-leading cause of death among adolescents globally. It is also among the top ten causes of death in low-income countries. HIV/AIDS is projected to become a leading cause of disease burden by 2030 (Mathers and Loncar, 2006; World Health Organization, 2020)

Indonesia has the third-highest number of people living with HIV and new infections in the Asia-Pacific region, after India and China. Data collected by the World Health Organization in 2019 showed that 81% of people living with HIV knew their status, 67% were receiving antiretroviral therapy, and 59% had achieved HIV viral suppression without the risk of infecting others. In Indonesia, data shows 143,590 people living with HIV, with only 77,748 people, or 33.5%, receiving ARV therapy. This falls short of the ARV therapy coverage target of over 80%. 31,415 people have not received ARVs, 31,487 have lost follow-up, and 2,940 have discontinued ARV therapy. A preliminary study of Ternate City Health Office data, based on cumulative HIV/AIDS data, revealed that as of December 2022, 2,363 people were living with HIV, of whom 2,125 were eligible for ARV treatment, 764 had previously received ARV therapy, and 286 (37.4%) were still on ARV treatment. Additionally, 262 people living with HIV died, and 129 lost follow-up (Kementerian Kesehatan RI, 2022).

The high mortality rate among HIV/AIDS sufferers is influenced by factors such as late HIV diagnosis, low awareness of serostatus, low CD4 count, high viral load, difficulty maintaining treatment, advanced disease stage, poor adherence to diet, low body weight, anemia, low socioeconomic status, late initiation of ARV, and poor adherence to antiretroviral therapy (ARV) (Colecraft, 2008; Bhattacharya, Dubey and Sharma, 2011; Arrivé *et al.*, 2012; Hickson and Mayers, 2020; Ramaiya *et al.*, 2020; Christopher *et al.*, 2021). Currently, there is no fully effective cure for HIV infection. However, with access to effective HIV prevention, diagnosis, treatment, and care—including treatment of opportunistic infections—HIV has become a manageable chronic condition, allowing people living with HIV to lead long, healthy lives (World Health Organization, 2023b).

Effective treatment with antiretroviral drugs (ARVs) can control the infection and disease progression, enabling HIV-positive individuals to enjoy healthy and productive lives. ARVs work by reducing HIV replication and preventing infection of new cells, which also improves immune system function. Consequently, ARV therapy positively impacts the quality of life and survival of those with HIV (Seyoum *et al.*, 2017; Nuraidah *et al.*, 2022). Several studies on HIV-positive patients indicate that adherence to ARV therapy in Indonesia remains low (Safira, Lubis and Fahdhy, 2018; Martiana, Waluyo and Yona, 2019; Nurfalah, Yona and Waluyo, 2019). Non-adherence to ARV therapy is dangerous because it can lead to increased viral load, disease progression, drug resistance, and a higher risk of transmitting resistant HIV to others, especially among sexually active adolescents (Attia *et al.*, 2009; Adejumo *et al.*, 2015).

Various barriers impede HIV-positive patients from adhering to ARV therapy, including feeling healthy (not yet experiencing opportunistic infections), fear of side effects, reluctance to take medication, boredom with treatment, stigma, discrimination, depression, limited access to healthcare facilities, transportation costs, and therapy expenses (Horne *et al.*, 2013; Bezabhe *et al.*, 2014; Wardhani and Yona, 2021; Purwaningsih, Asmoro and Prastiwi, 2022; Hutahaean, Stutterheim and Jonas, 2023). These barriers are largely driven by low self-efficacy and a lack of planning skills in HIV-positive individuals. Self-efficacy is the belief in one's ability to adhere to a treatment plan despite challenges such as side effects, disruptions to daily life, barriers to treatment, depression, and lack of social support. Multiple studies have demonstrated that self-efficacy influences health behavior changes (Isa *et al.*, 2017; Tharek *et al.*, 2018; Dzerounian *et al.*, 2022). Conversely, having good planning skills can enhance behavioral control. Planning serves as a self-regulation strategy to anticipate and manage challenges related to treatment.

There is an urgent need to address these barriers, as improving adherence to antiretroviral therapy is critical for the health outcomes of HIV-positive individuals and for

controlling the spread of HIV. The limitations of previous studies are that the last research from the research location did not cover all health services in the city of Ternate, limited to referral hospitals only, the geographical location is not accessible to all PLHIV, and the previous research method of the variables studied was limited to the threat of disease on adherence to taking ARV medication. For this reason, this study expands the research location to all HIV Support and Treatment (PDP) service locations in Ternate City. This study expands the research variables that show the influence of planning on ARV therapy adherence behavior. The purpose of this study is to study the correlation of self-efficacy, action planning, and coping planning with ARV therapy adherence in HIV-positive patients in Ternate, North Maluku Province.

LITERATURE REVIEW

Human Immunodeficiency Virus (HIV) is a virus that causes a decline in the human immune system, while Acquired Immune Deficiency Syndrome (AIDS) is a further development in people infected with HIV. "Acquired" refers to an infectious disease that is not hereditary but develops after direct contact with an HIV-infected person (Kristiono and Astuti, 2019).

HIV (Human Immunodeficiency Virus) is a virus that attacks the immune system, leaving the body vulnerable to various diseases. Acquired Immune Deficiency Syndrome (AIDS) can be defined as a collection of symptoms or diseases caused by a decline in the immune system due to HIV infection, specifically affecting T lymphocytes and reducing the number of CD4 cells, which are responsible for fighting infection. AIDS is the final stage of HIV infection (Kemenkes, 2020). The syndrome arises from a reduction in the body's immune system (CD4) that occurs approximately 5–10 years after HIV infection, progressing to AIDS, characterized by a CD4 count of less than 200 cells per µL of blood as the threshold criterion(Keputusan Menteri Kesehatan RI, 2019; Kristiono and Astuti, 2019).

Antiretrovirals (ARVs) are drugs that inhibit the replication of the Human Immunodeficiency Virus (HIV). ARV therapy is the most clinically successful strategy to date. Antiretroviral therapy (ARV) means treating HIV infection with drugs. These drugs (called ARVs) do not kill the virus but can slow its growth, slowing the viral growth rate and thus the course of HIV disease. Because HIV is a retrovirus, these drugs are commonly referred to as antiretroviral therapy (Nurihwani, 2017).

"Adherence" is an English term that refers to a client's compliance with treatment (on time, at the correct dose, and taken in the right way). Treatment adherence can be defined as the patient's behavior in following all the advice and instructions recommended by medical professionals, such as doctors and pharmacists, regarding everything that needs to be done to achieve treatment goals, one of which is adherence to taking medication. This is one of the successes of the treatment carried out (Kementrian Kesehatan, 2019).

Non-adherence to ARV therapy is very dangerous because it can lead to increased viral load, disease progression, drug resistance, and an increased risk of transmitting resistant HIV to others in sexually active adolescents (Adejumo *et al*., 2015)

Self-efficacy has been shown to have a stronger influence on ARV medication adherence in HIV-positive patients than other factors such as sociodemographics, duration of therapy, disease condition, interpersonal correlations such as social support, and other potentially related factors such as drug use (Colbert, Sereika and Erlen, 2013; Mi *et al*., 2020).

Action planning links goal-directed behavior to specific environmental cues by clarifying when, where, and how to act. This process can unintentionally trigger action and encourages individuals to follow their plans to reach their goals (Sniehotta *et al*., 2005; Kwasnicka *et al*., 2013). Research by Wee and Dilon (2022) found that action planning relates to increased physical activity. It serves as a bridge, helping turn intentions into actions

(Lippke, Ziegelmann and Schwarzer, 2005; Norman and Conner, 2005; Scholz *et al.*, 2008; Schwarzer and Luszczynska, 2008)

Coping planning is a self-regulation strategy that focuses on obstacles. This represents the mental connection between the anticipated risk situation and the appropriate coping response. Coping planning is a detailed plan to anticipate potential difficulties or obstacles that may arise when implementing an intention, consisting of a series of activities to identify unwanted obstacles or disruptions and how to overcome them (Wee and Dillon, 2022).

METHOD

The type of research is observational with a cross-sectional design. The research was conducted in five HIV service centers in Ternate City, North Maluku Province, namely Chasan Boesoirie Regional General Hospital, Siko Care Health Center, City Health Center, BLUD Kalumpang Health Center, and Kalumata Health Center. The population in this study was all HIV patients who had participated in the ARV treatment program in five HIV service centers in Ternate City, totaling 318 respondents. The minimum sample in this study was 178 PLHIV using a stratified random sampling technique. The sampling steps were (1) recording the number of PLHIV currently undergoing ARV treatment in five HIV service centers in Ternate City, (2) from the number of PLHIV in each service center, a representative sample was taken randomly, with 132 samples of PLHIV in Chasan Boesoirie Regional General Hospital, 10 samples in Siko Health Center, 10 samples in City Health Center, 11 samples in Kalumpang Health Center, and 15 samples in Kalumata Health Center. The inclusion criteria for this study were: HIV-positive patients registered in the medical records of Ternate City HIV services, willing to be interviewed, and undergoing ARV treatment. Respondents from outside the island and who were difficult to contact, as well as those who had moved, were excluded.

Data collection for this study was conducted over four months, from August to December 2023. Data collection was conducted using structured interviews guided by a questionnaire. The questionnaire's validity and reliability were tested on a sample of 20 people living with HIV. A calculated r value (correlation coefficient) of more than 0.444 indicated the instrument's validity. A Cronbach's alpha value of more than 0.6 indicated its reliability. The questionnaire consisted of eight questions on adherence, 12 questions on self-efficacy, three questions on action planning, and three questions on coping planning. Statistical analysis using Spearman's rho test was conducted to determine the relationship between self-efficacy, action planning, and coping planning and ARV adherence.

All participants in the study agreed to participate freely, as evidenced by the completion of an informed consent form. This research has passed the ethical review of Airlangga University under reference number 954/HRECC.FODM/VIII/2023.

RESULTS AND DISCUSSION

Statistical analysis revealed a significant relationship between self-efficacy, action planning, and coping planning and ARV therapy adherence in HIV-positive patients. The relationship between these variables was positive, indicating that the higher the self-efficacy, action planning, and coping planning, the higher the adherence of HIV-positive patients to ARV therapy. The results of the analysis can be seen in Table 1.

Socio-demographic factors consist of age, gender, education, occupation, income, and ARV. Based on the research results, most of the respondents were HIV patients with the age of 19-49 years (94.9%), male 123 (69.1%), high school education 102 (57.3%), the employment status of the majority of respondents was self-employed, including

housewives, traders, motorcycle taxi drivers, fishermen, massage parlors or beauty salons and the average income of respondents was low <1 million rupiah per month (33.1%) (Table 1).

Table 1. Frequency Distribution of Socio-Demographic Factors

Variable	Categories	Frequency (n)	Percentage (%)
Age (years)	10 – 18	1	6
	19 – 49	169	94.6
	>50	8	4.5
Gender	Males	123	69.1
	Female	55	30.9
Education	Non-School	2	1.1
	Elementary School	2	1.1
	Junior High School	18	10.1
	High School	102	57.1
	College	54	30.1
Occupation	Not working	37	20.8
	Civil Servant	29	16.3
	Private Employees	31	17.4
	Wireless	43	24.2
	Other	38	21.3
Revenue (Rupiahs*)	<1 million	59	33.1
	1 million – 2.5 million	52	29.2
	2 million – 5 million	53	29.8
	>5 million	14	7.9

Table 2. Frequency Distribution of Self-efficacy, Action planning, Coping planning, ARV compliance

Variable	Categories	Frequency (n)	Percentage (%)
Self Efficacy	Low	23	12.9
	Medium	120	67.4
	High	35	19.7
Action Planning	Low	17	9.6
	Medium	98	55.1
	High	63	35.4
Coping Planning	Low	38	21.3
	Medium	98	55.1
	High	42	23.6
ARV Adherence	Low	23	15.9
	Medium	80	44.9
	High	75	42.1

The results in Table 2 above show that the majority of respondents had moderate self-efficacy (n = 120, 67.4%). Only 35 patients (19.7%) had high self-efficacy. This indicates that only a few respondents had good self-efficacy. The average self-efficacy score of respondents was 39.52 out of a maximum score of 48, with a standard deviation of 6.26. The majority of respondents reported moderate action planning (n = 98, 55.1%). 63 patients (35.4%) had high action planning. Although not as low as the self-efficacy variable, respondents' action planning was still low, indicating that more than half of the respondents did not have good action planning skills. The average action planning score of respondents was 10.15 out of a maximum score of 12 and had a standard deviation of 1,777. The majority of respondents had moderate coping planning (n=98, 55.1%). Only 42 (23.6%)

respondents had high coping planning. This indicates that only a few respondents had good coping planning. The average score for coping planning was 9.35 out of a maximum score of 12 and had a standard deviation of 1,817. The majority of respondents had moderate adherence to ARV therapy (n=80, 44.9%). Only 75 (42.1%) respondents had high adherence to ARV therapy. This indicates that more than half of the respondents still did not have good adherence. The average score for respondent adherence was 28.61 out of a maximum score of 32 and had a standard deviation of 4,717.

Table 3. Correlation between self-efficacy, action planning, and coping planning with ARV adherence in HIV-positive patients

Variabel	Mean	SD*s	Minimum	Maximum	p	r
Self-efficacy	39.52	6.263	12	48	0.000	0.404
Action planning	10.15	1.777	3	12	0.000	0.399
Coping planning	9.35	1.817	3	12	0.000	0.265
ARV Adherence	28.61	4.717	8	32		

*SD: Standard Deviation

Table 3 above shows the results of the Spearman test, which found that self-efficacy (p=0.000), action planning (p=0.000), and coping planning (p=0.000) were significantly correlated with ARV therapy adherence in HIV-positive patients. Furthermore, the correlation coefficient was positive, indicating that the greater the self-efficacy (p=0.404), action planning (p=0.399), and coping planning (p=0.265), the greater the ARV therapy adherence in HIV-positive patients in Ternate.

Self-efficacy is often associated with positive health behaviors, such as engaging in recommended health behaviors, improving communication with healthcare providers, adapting to the disease, and treatment adherence (Oshotse *et al.*, 2018). This study found that self-efficacy was significantly associated with ARV therapy adherence in HIV-positive patients. These findings align with other studies (Colbert, Sereika and Erlen, 2013; Brown *et al.*, 2015; Machtinger *et al.*, 2015; Archiopoli *et al.*, 2016; Peng *et al.*, 2020). Self-efficacy in ARV treatment refers to a person's belief that they will be able to take ARVs as recommended. Self-efficacy has been shown to have a stronger influence on ARV therapy adherence in HIV-positive patients compared to other factors such as sociodemographics, duration of therapy, disease condition, interpersonal correlations such as social support, and other potentially related factors such as drug use (Colbert, Sereika and Erlen, 2013). Rather than seeing the difficulties and side effects of ARV therapy, someone with high treatment self-efficacy is more likely to see the benefits of treatment and try to prevent potential negative impacts (Mi *et al.*, 2020). Furthermore, self-efficacy can act as a protective barrier to reduce the negative impact of stigma on quality of life and is known to be a facilitator of ARV adherence (Zhang *et al.*, 2016; Zhou *et al.*, 2018). Therefore, self-efficacy-related interventions in HIV-positive patients, such as measuring self-efficacy levels, can be an early detection method for poor ARV therapy adherence. Kim et al. stated that measuring self-efficacy during routine visits to the clinic by HIV-positive patients can be an early detection method for future non-adherence to ARV therapy. Furthermore, interventions aimed at improving self-efficacy can improve adherence (Kim *et al.*, 2017).

Action planning is a detailed specification of when, where, and how to act in accordance with one's intentions. Action planning encourages a person to act according to a predetermined plan to achieve a goal (Sniehotta *et al.*, 2005). The results of this study indicate that action planning is significantly related to ARV therapy adherence in HIV-positive patients. Individuals with an action plan will find it easier to adhere to ARV therapy as recommended. This includes creating a specific schedule for taking ARVs,

organizing treatment-related needs such as finding a health facility or obtaining medication, planning questions to ask health professionals during consultations, and planning the best strategy for visiting health facilities, such as scheduling clinic visits and transportation. With careful planning, barriers to ARV therapy can be avoided.

To our knowledge, there has been no research examining the effect of action planning on ARV therapy adherence in HIV-positive patients. However, research on the effects of action planning has been conducted for other health behavior changes, such as regularly taking supplements, exercising, quitting smoking, and adopting a healthy (Godinho *et al.*, 2014; Hsieh, Kanda and Fujii, 2019; Wee and Dillon, 2022). In their study, Wee and Dillon (2022) found that action planning is associated with increased physical activity. By conducting action planning, a person can design the "how," "when," and "where" to achieve the desired behavior. This can remind them of the important steps needed to improve positive behavior (Wee and Dillon, 2022). Action planning serves as a bridge to translate a plan into action. Therefore, action planning can only be implemented after a person has the intention to do something (Ziegelmann, Lippke and Schwarzer, 2006). Coping planning is a detailed plan to anticipate difficulties or obstacles that may arise when implementing an intention. It consists of a series of activities that identify unwanted obstacles or disruptions and how to overcome them (Scholz *et al.*, 2008; Wee and Dillon, 2022). In our research, we found a significant relationship between coping planning and ARV therapy adherence in HIV-positive patients. Many obstacles contribute to non-adherence to ARV therapy (e.g., forgetting to take medication), and individuals with good coping planning will find potential solutions to address these obstacles (e.g., setting a medication alarm). Having a coping plan does not ensure a person's adherence to ARV therapy, but it does prevent someone who is already on ARV therapy from stopping due to obstacles such as reluctance to take medication or fear of side effects. This coping plan is more useful for maintaining behavior (Sniehotta *et al.*, 2005; Ziegelmann, Lippke and Schwarzer, 2006; Kwasnicka *et al.*, 2013). No research has examined the relationship between coping planning and ARV therapy adherence, but the influence of coping planning on other health behaviors has been extensively studied (Kwasnicka *et al.*, 2013). Research by Lin et al. found a strong relationship between coping planning and epilepsy treatment adherence. This indicates that patient anticipation of adherence barriers is a crucial factor, necessitating interventions to improve adherence by encouraging patients to overcome these barriers (Lin, Updegraff and Pakpour, 2016).

Self-efficacy, action planning, and coping planning all play a crucial role in helping individuals adhere to ARV therapy. Sometimes, individuals develop an action plan to adhere to therapy but fail due to a lack of ability to resist temptation, be assertive in the face of peer pressure, or overcome a temporary lack of motivation(Araújo-Soares, McIntyre and Sniehotta, 2009). Scholz et al. demonstrated how failure or mastery in implementing an action plan can influence self-efficacy for carrying it out. Self-efficacy in action planning is a key determinant of successful change. Those who adhere to action planning with coping planning are more likely to resist temptation, implement their plans, and experience mastery (Scholz *et al.*, 2007).

Physical activity-related interventions involving action planning and coping planning are more effective for behavior change and barrier management than other interventions. The combination of the two is considered more effective than interventions solely focused on action planning (Gollwitzer and Sheeran, 2006; Dombrowski *et al.*, 2012). On the other hand, Kwasnicka et al. argue that planning can serve as an effective behavior change technique, similar to physicians encouraging patients to adhere to treatment, but such efforts do not appear to be as effective in interventions that do not provide any support in formulating plans (Kwasnicka *et al.*, 2013).

Research on the influence of action planning and coping planning on ARV adherence in HIV-positive patients is limited, so this study was compared with research on other health behaviors. Therefore, the results of this study cannot be compared with findings in other areas related to ARV adherence. Further research on the relationship between action planning, coping planning, and ARV adherence, as well as related interventions, is needed.

CONCLUSION

Self-efficacy, action planning, and coping planning are significantly associated with ARV therapy adherence in HIV-positive patients in Ternate, Indonesia. Self-efficacy boosts patients' confidence in ARV adherence, action planning helps patients realize their intention to adhere to ARV, while coping planning helps patients maintain ARV adherence by finding solutions to overcome emerging obstacles. The recommendation from this study is for interventions to provide training on self-efficacy, action planning, and coping planning, which can be beneficial for maintaining ARV adherence in HIV patients in Ternate.

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