



Analysis of Factors Affecting Adherence to Anti-Retroviral Treatment among HIV/AIDS Out-patients at the Dinoyo Public Health Centre

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ABSTRACT

There is an increasing prevalence of HIV/AIDS cases in Indonesia, particularly in Malang City, a tourist and educational destination. This study aimed to identify the characteristics of people living with HIV/AIDS (PLWHA) as well as to analyze their adherence to anti-retroviral (ARV) treatment and the related factors. A cross-sectional observational study using a questionnaire was conducted to collect the data from PLWA at Dinoyo Public Health Centre, Malang City. The ACTG (Aids Clinical Trial Group) questionnaire was used to determine the level of adherence to ARV. A descriptive analysis was used to summarize the data, and a bivariate analysis using Chi-square tests was used to determine factors contributing to ARV adherence. A total of 35 PLWA were consented to this study. Most PLWA were males between the ages of 21 and 30 years, had a high school diploma, an income of more than 2 million IDR, worked in a private sector, and were singles. The majority of participating PLWA (60%) had adherence scores > 95%. Adherence was influenced by pharmacological side effects such as weariness or loss of energy, discomfort, numbness, tingling, or amnesia. Patient belief, such as when the patient was away from home, also had a significant impact on adherence to ARV treatment. Findings in this study reported that Dinoyo Public Health Centre has a high level of PLWA adherence. However, that patients are still in their productive years, so it is vital to devise a plan to promote adherence. Increasing HIV/AIDS education, both about the medicine, including adverse effects and how to cope with them, and about how to use the drug appropriately and accurately so that no dosage is missed, including teaching about living a healthy lifestyle, so if patients commit with this recommendation they still become productive in their live..

Keywords: Adherence, Anti-retroviral treatment, HIV/AIDS,

1. INTRODUCTION

The Human Immunodeficiency Virus (HIV) is a virus that causes AIDS, which is a collection of illness symptoms caused by immune system damage. This disease has rapidly increased the number of victims all over the world. This is why this disease is constantly a source of concern and a worldwide issue, especially since no one can guarantee that all individuals will adhere to effective prevention and therapy. ARVs are one strategy to minimize HIV transmission and mortality rates while also improving people's quality of life. According to the Ministry of Health's 2019 National Guidelines for HIV Health Services (Pedoman Nasional Pelayanan Kesehatan=PNPK), ARV medication is the most effective HIV transmission prevention at this time. In

non-HIV sexual partners, early ARV therapy reduces HIV/AIDS transmission by 93%. The goal of administering ARVs is to lower the quantity of virus in the patient's body so that the rate of HIV/AIDS transmission may be reduced and the quality of life of persons living with HIV/AIDS can be improved. ARV treatment can be effective and therapeutic goals can be met if the patient and health care providers work closely together. Patients must follow the therapy prescribed by health professionals. This is owing to the existence of a unique relationship between the efficacy of therapy and drug adherence, which is frequently missed by health professionals [1]. High adherence/adherence is a key

thread that connects attaining desired results in therapy and giving therapy with medications, in this case, ARVs.

The phrase Medication Adherence refers to a person's attitude, in this case, the patient's attitude toward using pharmaceuticals appropriately and according to a specified regulation of usage. Adherence must be maintained continually to attain the intended treatment benefits. However, the facts show that health personnels have not dealt with the common thread of adherence. On the other side, no matter how affordable and beneficial the medicine supplied to the patient is, if it is administered incorrectly, whether it is wrong dosage or improper indication, it can be deadly. ARV medication for HIV/AIDS patients is a lifetime treatment, thus patients must stick to ARV treatment for the rest of their lives. Patients must also follow additional regulations, such as diets, authorized activities, and adopting healthy lifestyle modifications. All additional regulations must be reviewed by medical personnels. Adherence to ARVs is the responsibility of both health personnels and patients. The adherence of HIV/AIDS patients to swallow the medicine is an essential aspect of the efficacy of ARV treatment [2]. According to Galistiani and Mulayananingsih (2013), side effects, fear of their status being revealed, forgetting to take medication or being too busy, depression or hopelessness, not understanding treatment, and not trusting treatment influence medication adherence in HIV/AIDS patients [3]. Other therapeutic parameters that influence ARV therapy include the number of medicines, active substance of medicine, side effects, the intensity of symptoms, and length of treatment. Environmental variables such as family support, societal stigma, and the interaction between health professionals and patients impact adherence. Other variables that impact adherence include the patient's clinical social features, lack of information about ARVs, and sex [4]. Another study briefly mentioned factors that affected adherence, such as patients -loss-to-follow up before ARV treatment was completed, a lack of knowledge about ARVs, psychological factors, economic factors, and the stigma about HIV/AIDS that developed in the surrounding community [5,6,7].

According to the data obtained from the Malang City Health Office, the number of new HIV/AIDS cases has grown in 2022 in Malang, with at least 481 new HIV/AIDS cases. Meanwhile, 329 additional HIV/AIDS infections are expected in 2021. In 2022, there will be 1756 of PLWHA receiving ARV treatment. This number has grown since 2021, with 1617 of PLWHA now receiving ARV medication. Malang has ten public health centre that treat HIV/AIDS patients. The Dinoyo Public Health Centre is one of them; it is the Health Centre with the greatest number of outpatient HIV/AIDS patients in Malang City. There are 800 HIV/AIDS patients undergoing outpatient care. Like the results of previous research by Galistiani et al. (2013), Sahay et al. (2011),

Kalichman et al. (2010), Diabate et al. (2007), Nachega et al. (2006), as well as data from the Malang Health Office above, this context prompted the researchers to investigate the characteristics that impact anti-retroviral anti-HIV medication adherence in outpatient HIV/AIDS patients at the Dinoyo Public Health Centre in Malang City, East Java.

1.1. Research objectives

The objective of this study was to evaluate the sociodemographic features of persons living with HIV/AIDS (PLWA) at the Dinoyo Public Health Centre, as the health facility with the highest number of HIV/AIDS patients in Malang City. Furthermore, this study aimed to determine the adherence to ARV treatment as well as the contributing factors.

2. METHODS

2.1 Study design

This is a cross-sectional observational study at the Dinoyo Public Health Centre, Malang City, Indonesia. This study has been granted ethical approval by the Institutional Ethical Committee of Universitas Surabaya No: 212/KE/VIII/2023 and the Health Research Ethics Committee Institute of Health Science Strada Indonesia No: 3931/KEPK/VIII/2023.

2.2 Data collection

There were 800 PLWA registered in Dinoyo Public Health Centre. A total of 35 participants were selected by the health centre professionals from a total sample of PLWA. This selection was the only possible approach as many HIV/AIDS patients were unwilling to participate because of fears that their identities would be exposed.

The selected PLWA were informed about the study and were asked for their participation. If they agreed to participate, they were asked to complete a questionnaire consisting of the following sections: i) characteristics (i.e. sex, age, education, level of income, level of occupation, marital status), ii) patient belief, iii) understanding of their clinical conditions, iv) drug variables (as of reflected of this research by adverse effects), v) external influences including stigma and treatment accessibility. Adherence was determined using a validated questionnaire from the ACTG (Aids Clinical Trial Group) [8].

2.3 Data analysis

Data from the questionnaire was summarized using descriptive analysis. Factors contributing to adherence were determined using the Test for Spearman correlation (factors: patient belief, side effects) as well as Chi-Square (treatment access, stigma, clinical state, socio-

demographic variables). SPSS (Statistical Program for Social Science) version 26 was used to assist with the analysis.

3. RESULTS

3.1 Demographic Characteristics

A total of 35 PLWA consented to participate in this study. The majority of participants (91.4%) were males, the majority of age was between 21 to 30 years (65.7%). In addition, the majority of participants had completed senior high school (54.3%), earned more than 2 million IDR (54.3%), and worked in private sectors (51.4%). Almost all the participants (88.6%) were not married (Table 1).

Table 1. Sociodemographic Characteristics of Participating PLWA

Parameter	Frequency	%
Sex		
- Men	32	91.4
- Women	3	8.6
Age (years)		
- 11-20	3	8.6
- 21-30	23	65.7
- 31-40	8	22.9
- 41-50	1	2.9
Last Education		
- Junior High School	1	2.9
- Senior High School	19	54.3
- Diploma	2	5.7
- Bachelor Degree	12	34.3
- Master Degree	1	2.9
Occupation		
- Private sectors	18	51.4
- Public sectors	2	5.7
- Others	15	42.9
Income		
- < 2 million IDR	16	45.7
- > 2 million IDR	19	54.3
Marital Status		
- Married	3	8.6
- Not Married	31	88.6
- Widower/Widow	1	2.9

3.2 Level of adherence

The PLWA level of adherence was summarized in Table 2. The majority of participating PLWA (54.3%) was reported to have high adherence (100% adherence).

Table 2. Level of Adherence among Participating PLWA

Adherence Score	Frequency	%	Adherence Categories (WHO, 2003)
100%	19	54.3	High adherence
95-99%	2	5.7	Adherence
90-94%	6	17.1	Not adherence

80-89%	6	17.1	Not adherence
≤79%	2	5.7	Not adherence

According to WHO adherence criteria in 2003, the majority of the research subjects at the Dinoyo Public Health Centre, including 21 subjects (60%) were categorized as high adherence/adherence, while the remaining 14 subjects (40%) were categorized as non-adherence.

3.3 Factors contributing to adherence

According to previous research, the factors that influence adherence in this study are (i) drug side effects such as pain, numbness, tingling, fatigue, or loss of energy; forgetting; (ii) the behavioral factor of patient beliefs such as being away from home; and (iii) the patient's clinical condition, specifically if the patient does not know his CD4 and VL values.

Table 3. Analysis of Spearman's correlation between drug-related factors and adherence to ARV

Side effect experiences	Correlation coefficient (r)	p-value
Fatigue/energy deficiency	-0.373	0.033*
High temperature and sweating	-0.072	0.690
Dizziness/a feeling of lightheaded	-0.201	0.263
Numbness, tingling, and pain	-0.347	0.048*
Disregard	-0.410	0.018*
Vomiting caused by nausea	-0.302	0.087
Diarrhea or peristalsis loss	-0.246	0.167
Sad and depressed	-0.249	0.161
Confused or nervous	-0.054	0.765
Hard to sleep	-0.124	0.484
Red, itchy, or dry skin	-0.170	0.336
Cough, or hard to breathe	-0.270	0.128
Headache	-0.106	0.555
Appetite loss/change in food flavor	-0.034	0.852
Bloating, discomfort, and stomach gas	-0.105	0.555
Muscle stiffness and joint discomfort	-0.004	0.981
Sexual issues	0.042	0.818
Body shape modifications	-0.142	0.429
Weight loss	-0.160	0.367
Hair loss	-0.072	0.686

*statistically significant (using Spearman correlation tests)

According to Table 3, adverse effects with a p-value of <0.05 include forgetfulness, exhaustion, lack of energy, soreness, numbness, and tingling. This shows that there is a link between the three side effects and adherence. This indicates that the more severe the three side effects get, become the more nonadherence the study participants. The research, however, did not specify the sorts of adverse effects that contributed to nonadherence with ARV treatment.

Table 4. Analysis of Spearman correlation between patient belief and adherence to ARV

Patient belief (reasons not taking ARV)	Correlation coefficient (r)	p-value
Take when away from home	-0.439	0.011*
When busy with something	-0.168	0.349
Easy to forget	-0.043	0.814
Too many drugs to take	-0.123	0.497
Want to avoid side effects	-0.196	0.274
Don't want others to know	0.013	0.944
Want to change habits	-0.214	0.233
Feel that the drug is toxic	-0.176	0.321
Fall asleep/sleep when taking medication	-0.038	0.831
Feeling sick/painful	-0.206	0.251
Depressed/overwhelmed	-0.105	0.561
Having problems taking medication	-0.020	0.912
Escape from drugs	-0.080	0.658
Felling happy	0.100	0.579

*statistically significant (using Spearman correlation tests)

The personal beliefs of the patient are another element that impacts adherence in this research. Patient belief refers to a person's attitude toward the availability

of ARV therapy in HIV/AIDS patients. Table 4 reveals that the p-value for practically all patient belief is more than 0.05. These findings suggest that there is no statistically significant correlation between patient belief and adherence to ARV therapy in patients living with HIV/AIDS. However, just one patient's belief, when away from home, has a p-value of < 0.05. The p-value of < 0.05 for patient's beliefs whenever away from home, indicating that there was a significant association between patient's belief and adherence while patient's away from home. When the subject was away from home, he frequently did not take the medicine because he has frightened his identity would be disclosed, thus creating shame. The researcher assumed that the respondent feel humiliated to his medicine when he is not at home.

Table 5. Chi-Square Analysis of correlation between patients' understanding about their clinical conditions and adherence to ARV

		Adherence Category		p-value
		Not Adherence	Adherence	
The subject knew their CD4 count and VL	Yes	Frequency 9	19	0.058
		% 32%	68%	
	No	Frequency 5	2	
		% 71%	29%	
The subject felt that the disease had been cured (did not feel any symptoms)	Yes	Frequency 6	12	0.407
		% 33%	67%	
	No	Frequency 8	9	
		% 47%	53%	

Table 6. Chi-Square Analysis of the Relationship Between Access to Treatment and Adherence

			Adherence Category		Total	p-value
			Not Adherence	Adherence		
Do you get ARV drugs for free?	Yes	Frequency	14	21	35	
		%	40%	60%		
Are ARV medications constantly available?	Yes	Frequency	14	21	35	
		%	40%	60%		
If the ARV medication was not/was not available at the time, were you requested to wait/come back another day to receive it?	Yes	Frequency	8	17	17	0.407
		%	47%	53%		
	No	Frequency	6	12	18	
		%	33%	67%		
Total		Frequency	14	21	35	
		%	40%	60%		
Are you willing/don't mind taking the ARV again another day?	Yes	Frequency	9	12	21	
		%	43%	57%		
	No	Frequency	5	8	13	0.800
		%	38%	62%		
Total		Frequency	14	20	34	
		%	41%	59%		

			Adherence Category		Total	p-value
			Not Adherence	Adherence		
Reasons for refusing to take ARVs on another day	Forget	Frequency	1	1	2	0.312
		%	50%	50%	100%	
	Lazy	Frequency	0	2	2	
		%	0%	100%	100%	
	A far location	Frequency	3	1	4	
		%	75%	25%	100%	
Need more cost	Frequency	0	2	2		
	%	0%	100%	100%		
Others	Frequency	9	13	22		
	%	41%	59%	100%		
Total	Frequency	13	19	32		
	%	41%	59%	100%		

Table 7. Chi-Square analysis of the relationship between stigma and adherence

			Adherence Category		Total	p-value
			Not Adherence	Adherence		
Have you ever gotten unfavorable treatment when visiting a hospital or public facility?	Yes	Frequency	2	1	3	0.289
		%	67%	33%	100%	
	No	Frequency	11	20	31	
		%	35%	65%	100%	
Total	Frequency	13	21	34		
	%	38%	21%	100%		

Table 8. Chi-Square analysis of the relationship between sociodemographic factors and adherence

			Adherence Category		Total	p-value
			Not Adherence	Adherence		
Gender	Man	Frequency	12	20	32	0.324
		%	38%	62%	100%	
	Woman	Frequency	2	1	3	
		%	67%	33%	100%	
Total	Frequency	14	21	35		
	%	40%	60%	100%		
Age	11-20 years old	Frequency	1	2	3	0.786
		%	33%	67%	100%	
	21-30 years old	Frequency	9	14	23	
		%	39%	61%	100%	
	41-50 years old	Frequency	0	1	1	
		%	0%	100%	100%	
Total	Frequency	14	21	35		
	%	40%	60%	100%		
Last Education	Junior School	Frequency	0	1	1	0.737
		%	0%	100%	100%	
	Senior School	Frequency	7	12	19	
		%	37%	63%	100%	
	Associated Degree	Frequency	1	1	2	
		%	50%	50%	100%	
	Bachelor Degree	Frequency	6	6	12	
		%	50%	50%	100%	
	Master Degree	Frequency	0	1	1	
		%	0%	100%	100%	
Total	Frequency	14	21	35		
	%	40%	60%	100%		

		Adherence Category			Total	p-value
		Not Adherence	Adherence			
Occupation	Private	Frequency	6	12	18	0.707
		%	33%	67%	100	
	Self-employed	Frequency	1	1	2	
		%	50%	50%	100	
	Others	Frequency	7	8	15	
		%	47%	53%	100	
Total		Frequency	14	21	35	
		%	40%	60%	100%	
Monthly Earning	< 2 million	Frequency	8	8	16	0.268
		%	50%	50%	100%	
	> 2 million	Frequency	6	13	19	
		%	32%	68%	100%	
Total		Frequency	14	21	35	
		%	40%	60%	100%	
Marital Status	Married	Frequency	2	1	3	0.455
		%	67%	33%	100%	
	Not married	Frequency	12	19	31	
		%	39%	61%	100%	
	Widower/Widow	Frequency	0	1	1	
		%	0%	100%	100%	
Total		Frequency	14	21	35	
		%	40%	60%	100%	

The clinical status of the patients in this study was another factor influencing adherence to ARV medication in HIV/AIDS individuals. Clinical situations connected to CD4 count and VL knowledge, as well as adherence behavior resulting from this information were detailed in this study. In this study, clinical circumstances were assessed using a response scale, and adherence was divided into two categories: nonadherence and adherence. Table 5 shows that the individuals knew of and comprehended their own CD4 and VL counts, and the majority of them stayed on ARV medication did not associated. Furthermore, even if the subject believes that the sickness had been healed (since there were no symptoms), also did not associated with their adherence.

The findings of statistical computations yielded a p -value greater than > 0.05 , indicating that statistically, there was no significant association between comprehension of the subject's own clinical state and adherence.

As indicated in Table 6, most of the participants (more than half) reported that ARVs were always accessible at the Dinoyo Public Health Centre in Malang City, and they received ARVs for free. If ARVs were not yet accessible for any reason, the majority of the subjects were willing to wait for ARV availability at the Dinoyo Public Health Centre, and they were also willing to come the next day to take ARVs. Meanwhile, participants who were unwilling to wait or to come to take ARVs the next day did so for a variety of reasons, the majority of which were unknown. The p -value for ARV availability was greater than 0.05, indicating that there was no significant

correlation between ARV availability at the Dinoyo Public Health Centre and adherence.

According to Table 7, nearly all individuals (31 out of 35 samples) said that they had never gotten unpleasant treatment while receiving ARV therapy at the Public Health Centre. Because the stigma component has a p -value greater than > 0.05 , it has no effect on adherence. As proved in Table 8, all sociodemographic parameters (sex, age, last education, occupation, income, marital status) had no significant correlation with adherence since the p -value is greater than > 0.05 .

4. DISCUSSION

There were 32 (91.4%) men and 23 (65.7%) women among the 35 research subjects. This is consistent with research done by Zolopa AR in 2009, which indicated that the majority of the individuals were men [9], as well as research done by NLP and Dwi Rahayu in 2016, which said that all subjects in the study were men [10]. Meanwhile, the Ministry of Health of the Republic of Indonesia reports that the majority of HIV/AIDS patients are men [11]. However, there was no significant association between sex and adherence at the Dinoyo Public Health Centre, despite sociodemographic data indicating that all male patients were compliant with receiving ARV medication. The underrepresentation of women in the studies of PLWA could cause this. Age, education level, and income and also marital status had no effect on ARV adherence.

In terms of adherence, the majority of the participants, up to 60% of the 35 individuals, were

labeled as adherence. And the subject's adherence score is exceptionally high, with a score of more than 95%. According to the researcher's perspective, this shows that the individuals understand how critical it is to use ARV medication appropriately and accurately. This is also very interesting to further study looking for their reason why they still continue their treatment to be continued indefinitely. Subjects also understood that if the amount of HIV virus in their systems could be lowered by adhering to regular and accurate ARV medication, they could carry out activities like healthy persons. This adherence score is consistent with the findings of another researcher, Renny Endang, who found that subject adherence was 55.2% [12]. According to Rita, ARV treatment was successful in reaching more than half (65.7%) of adhering responders [13] in 2019. Similarly, Aji (2010) found that out of 70 research subjects, more than half (71.4%) adhered to ARV therapy (> 95%) [14]. The researcher assumes that 60% of the subjects are extremely adherence and adhere to the protocol very well (> 95%). According to the primary health centre professionals that interviewed the participants this is due to the individuals' desire to reduce the amount of virus in their body in order to live a much healthier life. This adherence score is consistent with the findings of Velisitas (2013), who discovered that the person has an internal desire to receive ARV medication in order to prevent the virus from developing in his body [13].

The behavioral element of patient believe in the form of when the patient is away from home has a significant association between the patient's belief in the form of when the patient is away from home and the medication adherence. The reason of this significant association may be most patients are uncomfortable taking ARV medication in a new setting, and patients are ashamed if someone discovers that the substance they are taking is an ARV (HIV/AIDS medication). This is comparable to the research done by Sholichatus (2021), who says that one of the reasons affecting adherence to ARV therapy is the patient's humiliation if someone other than family or the closest person knows the type of medicine being taken (ARV) [15]. According to Jaemi's 2020 research, the subject's behavioral abilities (including humiliation) are directly associated to adherence [16]. The same findings were obtained in a study done by Abdul Kharis (2016), who discovered that patients were ashamed if their positive HIV status was disclosed to others [17].

The clinical state of the subject is the condition of the sickness, which must be the subject itself. The majority of the p-values for clinical conditions are more than 0.05. This suggests that there is no substantial association between the individuals' comprehension of their own clinical state and adherence. This is consistent with Wulandari's 2021 study, which found no association between the subject's level of understanding and adherence [18].

Adherence is also affected by drug characteristics such as side effects. According to this study, there is a substantial correlation between pharmacological side effects including forgetfulness, weariness, lack of energy, discomfort, numbness, tingling, and adherence. According to the subject, these three sorts of side effects might interfere with the subject's regular job and activities. While the subjects felt compelled to work and they must support their families there for the subject must act as though they are not infected with HIV/AIDS. These findings contradict Aisha's research from 2021. Aisha categorized the amount of medication side effects into three categories: mild, moderate, and strong side effects (this was not done in our study), which had no significant with adherence [19].

Adherence is also influenced by treatment accessibility. The availability of ARV medications at the Dinoyo Public Health Centre in Malang City is used to define treatment access here. If ARVs are not accessible at the health service centre, the majority of subjects are prepared to wait for them to become available again and are also willing to return the following day in accordance with the agreement made between the personnel of health service and the patient. This study is consistent with Selina's *et al.* research in 2022, which looked at the association between adherence to health services and HIV/AIDS patients, and found that there was no significant relationship between PLWHA adherence and health services at Biak Hospital [20]. However, health services at Biak Hospital or the Dinoyo Public Health Centre must be upgraded further so that PLWHA adherence to ARV medication may be considerably boosted .

In this study, stigma had no correlation with adherence. This finding should be further study may be related to the neighborhood around the Dinoyo Public Health Centre has an average middle and high school education, and the Dinoyo Public Health Centre's location is surrounded by campuses. Berliana (2017) found that the amount of information of the surrounding population is critical for PLWHA to avoid negative stigma [21]. According to Wira's 2021 research, there is a substantial association between self-stigma and adherence [22].

5. CONCLUSION

The majority of HIV/AIDS patients at the Dinoyo Public Health Centre were young men, with nearly half of them having strong adherence. While side effects and patients' belief are variables that influence HIV/AIDS patients' adherence, it is vital to provide education on how to cope with side effects that emerge in order to promote adherence to ARVs. It is also vital to assist PLWHA in dealing with their circumstances while they are away from home in order to maintain or increase adherence.

AUTHORS' CONTRIBUTIONS

• Annisa Lazuardy conceived and designed the experiments, performed the experiments, analyzed the data, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.

• Yosi Irawati Wibowo conceived and designed the experiments, authored or reviewed drafts of the article, and approved the final draft.

• Adji Prayitno Setiadi conceived and designed the experiments, authored or reviewed drafts of the article, and approved the final draft

ACKNOWLEDGMENT

We would like to thank staff from Dinoyo Public Health Centre as well as all of the participants. We also would like to thank Dr. Cecilia Brata and Dr. Bobby Presley for their valuable insights.

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