### **INTERNATIONAL JOURNAL OF HEALTH & MEDICAL RESEARCH**

ISSN(print): 2833-213X, ISSN(online): 2833-2148

Volume 04 Issue 05 May 2025

DOI: 10.58806/ijhmr.2025.v4i5n08

Page No. 295-304

### Determinants of Low Adherence to Antiretroviral Therapy Among Patients on Highly Active Antiretroviral Treatment at the Selective Public Hospital in Addis Ababa, Ethiopia, 2022

Eunice Borkor Bortequaye<sup>1\*\*</sup>, Rafia Hussain<sup>2</sup>, Hamlet Asfaw Gebreselassie<sup>1</sup>, Bruktawit Ketema Belayneh<sup>1</sup>, Fiyameta Abraham Fissehatsion<sup>1</sup>, Yabets Alemu Mamo<sup>6</sup>, Adonias Ager Sinshaw<sup>5</sup>, Yonas Zewdu Milikit<sup>3</sup>, Mickiyas Ayalew Mekonnen<sup>3</sup>, Samrawit Teame Gebremariam<sup>1</sup>, Biruk Dula Goraga<sup>5</sup>, Arsema kinfemicheal seifu<sup>1</sup>, Amanu Zewdie Belta<sup>6</sup>, Alazar Molla Tesfaye<sup>5\*</sup>, Mekurab Kebede Mergia<sup>4\*</sup>

<sup>1</sup>Department of Medicine, Zewditu Memorial Hospital, Addis Ababa, Ethiopia
<sup>2</sup>Department of Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
<sup>3</sup>Department of Medicine, University of Gondar, College of Medicine and Health Science
<sup>4</sup>Department of Medicine, Jimma University, Oromia Region, Ethiopia
<sup>5</sup>Department of Medicine, Addis Ababa University, College of Medicine and Health Science, Addis Ababa, Ethiopia

<sup>6</sup>Department of Medicine, Hawassa University, School of Medicine and Health Science

**ABSTRACT:** HIV/AIDS is a chronic infectious disease caused by the human immunodeficiency virus, which is characterized by a spectrum starting from primary infection with or without the acute syndrome. HIV infections are a major global public health concern. In 2019, an estimated 38 million people were living with HIV infection, and 1.7 million people became newly infected. Adherence is one of the major critical things in chronic diseases like HIV/AIDS to suppress the viral replication and to decrease the impact of the disease on one's own life through increasing quality of life and on a country by saving skilled manpower. Poor adherence is one of the major challenges in sub-Saharan African countries like Ethiopia due to factors like socio-demographic, behavioral, disease characteristics, medication-related adverse effects and health system-related factors. This study aims to know and solve the factors, increase adherence to anti-retroviral therapy and improve the quality of life for the patients.

**Objective**: To assess the determinants of low adherence to antiretroviral therapy among patients receiving highly active antiretroviral treatment (HAART) at a selected public hospital in Addis Ababa, Ethiopia, in 2022.

**Methods:** A cross-sectional study was conducted using convenience sampling among 220 eligible HIV-positive adult patients receiving antiretroviral therapy (ART) at Zewditu Memorial Hospital and Yekatit 12 General Hospital. Data were collected through structured questionnaire interviews and retrospective chart reviews. The data were analysed using SPSS version 25. Results were presented using frequencies, percentages, means, and standard deviations, and were displayed in tables and graphs.

**Result:** A total of 220 study participants were included in the study, with 110 participants from Zewditu Memorial Hospital and 110 participants from Yekatit 12 General Hospital. The mean age of the participants was 41.2 years. Among the study participants, 132 (60%) were female, and 88 (40%) were male. Regarding marital status, 129 (56.4%) were unmarried. In terms of education, 91 (41.4%) had attended secondary school, while 131 (59.5%) had completed their secondary education.

**Conclusion:** In our study, the majority of participants demonstrated good adherence to treatment. However, the proportion of individuals with poor adherence was still considerable. Additionally, none of the assessed factors showed a significant association with poor adherence.

KEYWORDS: Adherence, Antiretroviral Therapy (ART), Determinants, HIV/AIDS

#### INTRODUCTION

#### 1. Background

Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) is a chronic infectious disease caused by the Human Immunodeficiency Virus (HIV). It is characterized by a spectrum that begins with a primary infection, sometimes accompanied by an acute syndrome, followed by a relatively long asymptomatic stage. In most cases, the disease eventually progresses to an advanced, life-threatening condition known as

acquired immunodeficiency syndrome (AIDS). Historically, AIDS was first recognized in 1981 in the United States among homosexual men. In 1983, a retrovirus—later named HIV—was isolated from a patient with lymphadenopathy. In 1984, HIV was definitively identified as the causative agent of AIDS [1].

HIV/AIDS is primarily transmitted through sexual contact. Other modes of transmission include direct contact with contaminated blood products and vertical transmission from mother to child. HIV targets the immune system, weakening the body's natural defense mechanisms against infections and certain types of cancer. The virus specifically destroys immune cells, leading to a gradual decline in immune function. As a result, individuals infected with HIV become immunodeficient and increasingly susceptible to a wide range of infections and diseases that people with a healthy immune system can typically resist [2].

HIV infections are a major global public health concern. In 2019, an estimated 38 million people were living with HIV infection, and 1.7 million people became newly infected. Sub-Saharan Africa (SSH) remains the most affected region in the world, with about 20.7 million prevalent cases and 730,000 infections, recorded secondly by Asia and Pacific region with 5.8 million prevalent cases [3].

In 2020, approximately 37.7 million people globally were living with HIV/AIDS, and 70% of them were accessing antiretroviral therapy (ART). Among adults aged 15 years and older, 70% were receiving ART. Of those adults, 70% were women and 60% were men. Additionally, 50% of children aged 0–14 years were also on ART.

In the same year, 80% of pregnant women living with HIV were receiving ART to prevent vertical transmission to their children. There were 1.5 million new HIV infections in 2020, a significant decline compared to 1997, when 3 million people were newly infected. Women and girls accounted for 50% of all HIV cases.

Since 2010, the number of newly infected individuals has declined by 1% overall and by 50% among children. Every week, around 5,000 young women aged 15–24 years globally, and approximately 4,200 in sub-Saharan Africa, were newly infected—often linked to experiences of physical or sexual violence by an intimate partner or non-partner. Women who experience such violence are 1.5 times more likely to become infected with HIV than those who do not. In sub-Saharan Africa, 60% of newly infected individuals were women and girls. Globally, in 2020, 60% of HIV infections occurred among key populations—such as sex workers and their clients, gay men and other men who have sex with men, people who inject drugs, and transgender individuals. Ninety percent of HIV cases among key populations occurred outside of sub-Saharan Africa, while 39% of new infections in this group were in sub-Saharan Africa. The risk of acquiring HIV was 35 times higher among people who inject drugs, 34 times higher among transgender women, 26 times higher among sex workers, and 25 times higher among gay and bisexual men.

Globally, 80% of people living with HIV knew their status in 2020, and 70% were accessing ART. Among those receiving treatment, 66% achieved viral suppression. HIV-related deaths have decreased by 60% since the peak in 2004 and by 47% since 2010. In 2020, around 680,000 people died from AIDS-related illnesses. AIDS-related mortality declined by 50% among women and girls and by 40% among men in 2020. [4]

#### **1.2. Statement of the problem**

Recent data indicate that over 90% adherence to the antiretroviral therapy (ART) regimen is necessary for people living with HIV (PLWHIV) to achieve full viral suppression. However, maintaining this level of adherence requires accurate and consistent monitoring, which remains a significant challenge in sub-Saharan African countries, including Ethiopia. In Ethiopia, studies have shown that between 3% and 35% of PLWHIV do not adhere to their prescribed ART regimens. Research conducted in various settings has identified several factors affecting adherence, including demographic, behavioral, disease-related, medication-related, and health system-related factors.

To address these challenges, Ethiopia has implemented various strategies, such as transitioning from fee-based to free ART programs, decentralizing services to lower-level public health facilities and private hospitals, building the capacity of service providers, and enhancing counseling services. Despite these efforts, maintaining high levels of adherence continues to be a persistent challenge for the ART program in the country [5].

The HIV/AIDS pandemic has imposed a serious socioeconomic burden on individuals, families, communities, health institutions, and governments [6]. According to 2020 data, 28.2 million people were accessing ART, while 1.5 million individuals were newly infected with HIV.

Young adults—who are at a stage of heightened sexual activity and often exposed to sexually explicit media and social platforms are particularly at risk. Additional high-risk groups include people who inject drugs (including illegal substances), sex workers, transgender individuals, gay and bisexual men (men who have sex with men), and racial and ethnic minorities such as African Americans and Hispanic/Latinos. These populations are not only at higher risk of acquiring HIV but also play a significant role in the continued transmission and increased incidence of the virus [7].

The Ethiopian Population-Based HIV Impact Assessment reported an HIV prevalence of 3.0% in urban areas. Furthermore, HIV prevalence in the country has shown variable trends across different population groups, influenced by various socio-demographic factors [8].

HIV infection significantly impacts individuals by reducing their quality of life, causing loss of employment, diminishing their ability to care for their families, and weakening their immune systems, making them more vulnerable to opportunistic infections. These challenges may lead to fatigue, difficulties in daily functioning, and reduced access to necessary medications. At the national level, the impact includes a loss of skilled labor and economic burden, particularly due to increased healthcare costs and the need for sustained funding for HIV treatment programs [9].

Non-adherence to ART can result in drug resistance, treatment failure, and limited future treatment options. Among adult patients in the region, various barriers to ART adherence have been identified. These include fear of HIV status disclosure, HIV-related stigma, alcohol and drug abuse, forgetfulness, complex ART regimens, pill burden, medication side effects, transportation costs, and financial constraints [10]. Despite the existence of several studies, many of these challenges remain inadequately addressed. Therefore, this study aims to assess the key factors that may contribute to decreased adherence among patients receiving ART.

#### 1.3 Significance of the study

This study aims to improve adherence levels among patients in order to achieve optimal outcomes. Lifelong adherence to antiretroviral therapy (ART) is essential for increasing life expectancy and maintaining viral suppression. In the context of highly active antiretroviral therapy (HAART), poor adherence often leads to treatment failure and may necessitate alternative regimens, which are limited due to potential cross-resistance among medications. Therefore, this study is crucial for identifying the predisposing factors that affect adherence to HAART. By understanding and addressing these factors, the study seeks to mitigate health service challenges, enhance the effectiveness of ART programs, and ultimately improve the quality of life for individuals living with HIV

#### 2. LITERATURE REVIEW

A cross-sectional study was conducted in 2017 in Vietnam to assess adherence to antiretroviral therapy (ART) and its associated factors in the context of universal ART initiation. Adherence was measured using a 100-point visual analog scale. The results showed that patients missed doses for up to 4 days and experienced delays of up to 7 days in taking their medication, revealing a high prevalence of suboptimal adherence. Both optimal adherence and non-adherence were also reported. Factors such as living in rural areas, travel difficulties, and current smoking were identified as predictors of suboptimal adherence to the ART regimen. Additionally, patients with clinical symptoms who required multiple drug regimens were more likely to be non-adherent due to drug interactions and pill burden. On the other hand, being female and having an initial CD4 count of at least a certain level (cells/mm<sup>3</sup>) were associated with optimal adherence to ART [11].

A study conducted in Brazil in 2014 assessed psychosocial factors associated with ART adherence and quality of life among people living with HIV/AIDS. This cross-sectional study focused on perceived stress, social support, symptoms of anxiety and depression, and quality of life as key variables. The results showed that moderate to high adherence to ART was linked to a strong sense of social support, which in turn contributed to higher quality of life. Symptoms of anxiety and depression were found to be major factors contributing to non-adherence to ART. The combination of social support and adherence to ART regimens was shown to improve immune response, physical health, and overall quality of life for patients living with HIV (12).

Another cross-sectional, exploratory study conducted in São Paulo, Brazil, aimed to determine the level of ART adherence and the factors influencing it. The study found that 80.7% of participants had insufficient adherence. It was observed that ART adherence was associated with the presence of symptoms, opportunistic infections, and economic status. Patients who reported favorable economic status or lacked symptoms and/or opportunistic infections demonstrated better adherence compared to those requiring multiple pills per day (13).

Adherence to ART is critical in the management of chronic diseases like HIV/AIDS. High adherence is essential for viral suppression, prevention of ART resistance, and disease progression. A cross-sectional study in Indonesia, conducted in 2017, explored socio-demographic factors associated with adherence to ART. Among 202 participants, 84.16% showed high adherence, while 15% had low adherence. Factors influencing adherence included employment status, adverse effects of ART, and family support, while no association was found with socio-demographic characteristics. Reasons for non-adherence included feeling healthy, adverse effects of the drugs, busy schedules, and distance from home (14).

In a September 2019 study in Indonesia, self-efficacy and depression were found to significantly influence ART adherence. Individuals with high self-efficacy were more likely to adhere to the regimen (p-value 0.004, OR 2.330). Additionally, depression was negatively associated with adherence (p-value 0.001, OR 3.647). The study concluded that improving self-efficacy and addressing depression could enhance adherence rates (15).

A 2018 study conducted in Gosia state explored the relationship between ART adherence, adverse effects, and co-infections among people living with HIV/AIDS. The study found that 80% of participants demonstrated good or strict adherence to ART, with no significant associations between adherence and socio-demographic factors. However, ART-related adverse effects and sexual orientation were significantly associated with adherence. Additionally, 14% of participants were identified as non-adherent (16).

In 2021, a study in Haini assessed the factors associated with ART adherence among people living with HIV. The study found that only 3.41% of participants reported full adherence, and 20% exhibited less than optimal adherence. Factors contributing to poor adherence included younger age and the inability to meet basic needs. The authors recommended increasing awareness of ART importance, providing financial support, and implementing additional social support interventions to improve adherence (17).

A study in 2017 in northern Tan identified predictors of non-adherence to ART, including younger age, unemployment, urban living, and high CD4 counts. These factors were associated with lower adherence levels (18).

Another study, conducted between September 2013 and January 2014, assessed the diagnostic accuracy of adherence assessment tools using sensitivity, specificity, and predictive values. Among 98 HIV-infected patients, 80% reported optimal adherence, with only 5.9% showing viral failure. The study highlighted that adherence monitoring tools were helpful in identifying adherence patterns and improving ART outcomes (19).

In a study conducted in Benishangul-Gumuz between April and May 2017, 39.7% of the participants were found to be non-adherent to ART. The study identified young age, urban residence, lack of employment, food insecurity, malnutrition, and opportunistic infections as significant factors contributing to non-adherence (24).

A cross-sectional study in South Wollo, Northern Ethiopia, conducted in 2014, assessed ART adherence among children. The study found that 78.6% of caregivers reported that their children adhered to the ART regimen. Factors influencing adherence included the caregiver's knowledge about ART, the absence of substance use by the caregiver, whether the child was aware of their HIV status, and the caregiver's education level (25).

Overall, research shows that ART adherence rates have increased over the years due to targeted interventions addressing known barriers. Factors such as awareness of HIV status, understanding ART regimens, and strong family support systems have been consistently linked to improved adherence. However, challenges like younger age, unemployment, mental health issues, and experiences of stigma continue to negatively impact adherence and need further attention.

#### **3. OBJECTIVE**

#### 3.1. General objective

To assess the determinants of low adherence to antiretroviral therapy among patients receiving highly active antiretroviral treatment (HAART) at a selected public hospital in Addis Ababa, Ethiopia, in 2022.

#### **3.2**. Specific objective

- > To determine the level of adherence to HAART among adult HIV-positive patients at the selected hospital.
- > To identify socio-demographic factors associated with low ART adherence.
- > To assess the impact of clinical factors on adherence.
- > To evaluate patient-related factors such as knowledge about HIV/ART, stigma, and beliefs that influence adherence.

#### 4. METHODS

#### 4.1. Study area and period

The study was conducted in two public hospitals in Addis Ababa, Ethiopia. The first hospital is **Zewditu Memorial Hospital**, located in the Kirkoss sub-city, Woreda 08. Established by the Seventh-Day Adventist Church, the hospital was nationalized during the Derg regime in 1976 E.C. It was named after Empress Zewditu, the cousin and predecessor of Emperor Haile Selassie. Currently, the hospital is operated by the Ministry of Health. Zewditu Memorial Hospital has grown to become the largest HIV clinic in Ethiopia, with over 14,000 patients under its care. Since the initiation of the ART program in other hospitals across the country, pressure on Zewditu has eased. The hospital provides various services, including palliative care, HIV counseling and testing, sexually transmitted disease services, and post-exposure prophylaxis (PEP).

The second hospital involved in the study is **Yekatit 12 General Hospital**, which was established in 1923 as one of Ethiopia's first modern medical service delivery centers. Located on Sidist Kilo Tewodros Street in Addis Ababa, Yekatit General Hospital has been an essential healthcare facility in the region for decades.



Fig.4.1. Yekatit 12 General Hospital, Fig. 4.2 Zewditu Memorial Hospital

#### 4.2. Study design

A cross-sectional study was conducted using quantitative data collection tools. The data collection instruments, consisting of structured questions, were pre-tested prior to implementation. A chart review was performed to assess poor ART adherence and its associated factors among patients receiving HAART at Zewditu Memorial Hospital and Yekatit General Hospital in Addis Ababa, Ethiopia.

#### 4.3. Study population

#### 4.3.1. Target population

The target population were all HIV patients which taking HAART in Addis Ababa, Ethiopia.

#### 4.3.2. Source population

The source population were all HIV patients which taking HAART and attending Zewditu Memorial Hospital and Yekatit 12 hospital.

#### 4.3.3. Study population

The study population included all HIV patients on HAART, aged 18 years or older, who were willing to participate in the study at the time of data collection at Zewditu Memorial Hospital and Yekatit 12 Hospital.

#### 4.4. Inclusion and Exclusion criteria

#### 4.4.1. Inclusion Criteria

- All ART patients who consent to participate in the study and are present at the time of data collection.
- Patients aged 18 years and older.
- Patients who have attended at least 1 year of follow-up at the hospital.

#### 4.4.2. Exclusion Criteria

- Patients with incomplete medical records.
- Patients who require family or nursing care.

#### 4.5 Sample size determination

A single population proportion formula was used to calculate the sample size. Based on a proportion of poor adherence from a previous study (17.4%) (5), with a margin of error of 5% and a 95% confidence interval, the required sample size was approximately 221 patients who were on ART treatment and met the eligibility criteria at the time of data collection.

#### $\mathbf{n} = (\underline{\mathbf{Z}}_{\alpha/2})^2 \mathbf{P} (\mathbf{1} - \mathbf{P})$ where: n- sample size

$\mathbf{W}^2$	P – Proportion			
$n = (\underline{1.96})^2 \ \underline{0.174}(\underline{10.174})$		$\underline{\mathbf{Z}}_{\alpha/2}$ – the value of Z from stan	$(0.05)^2$	normal distribution
level at a given confidence	level			
<u>n=220.8~</u> 220		α- Level of significance		

#### 4.6. Sampling procedure

The technique used in this study was probability systematic random sampling for chart review on 220 patients.

#### 4.7. Study variables

4.7.1. Dependent variable

Poor adherence to ART

#### 4.7.2 Independent Variables

- ➤ Socio-demographic factors
- > Drug-related factors
- ➤ Social behavior
- ➤ Knowledge, attitude, and belief about the disease
- ➤ Social acceptance of the patient

#### 4.8. Data collection tool and method

A structured standard pre-tested questionnaire for chart review was used as a data collection tool.

#### 4.9. Data entry and analysis

A descriptive quantitative analysis was performed, utilizing frequency, percentage, mean, and standard deviation to summarize the data. The data were entered into the Statistical Package for Social Sciences (SPSS) software, and the results were presented in tabular and graphical formats.

#### 4.10. Operational definition

Adherence is defined as the goal of taking medication at the appropriate time with minimal or no missed doses.

**Good adherence** is considered when more than 95% of doses are taken as prescribed, meaning fewer than two doses are missed out of 30 doses, as documented by the ART healthcare provider.

**Poor adherence** is defined as 85%–94%, which means three to five doses are missed out of 30 doses, as documented by the ART healthcare provider (20).

#### 4.1.1. Ethical consideration

Ethical clearance for this study was obtained from the relevant ethical review board, and an official letter of cooperation was provided to Zewditu Memorial Hospital and Yekatit 12 General Hospital, where the study was conducted. Prior to data collection, all eligible participants were thoroughly informed about the study's objectives, procedures, potential risks, and benefits. Both written and verbal informed consent were obtained from each participant, ensuring that participation was entirely voluntary. Participants had the right to withdraw from the study at any time without facing any consequences. Strict confidentiality and privacy were maintained throughout the study. No personal identifiers were collected, and all information was securely handled and used solely for research purposes to protect the privacy and rights of the participants.

#### 4.1.2. Data quality management and assurance

The data collection tool that we used was a standard structured questionnaire for chart review was pre-tested before application on the subject studied in the hospital.

#### 5. RESULT

#### 5.1. Socio-demographic characteristics

A total of 220 study participants were included in the study, with 110 participants from Zewditu Memorial Hospital and 110 participants from Yekatit 12 General Hospital. The mean age of the participants was 41.2 years. Among the study participants, 132 (60%) were female, and 88 (40%) were male. Regarding marital status, 129 (56.4%) were unmarried. In terms of education, 91 (41.4%) had attended secondary school, while 131 (59.5%) had completed their secondary education.

Value		Frequency	Percentage
Sex	Female	132	60
Age	Male 18-30	88 48	40 21.8
	30-45 >45	84 88	38.2 40
Social history	Alcohol	17	7.7
	Smoking	2	0.9
	Chat	2	0.9
Education	Primary school	57	25.9
background	Secondary	91	41.4
	Graduated	62	28.2
	Un educated	10	4.5
Employment states	Employee	89	40.5

Determinants of Low Adherence to Antiretroviral Therapy Among Patients on Highly Active Antiretrovira
Treatment at the Selective Public Hospital in Addis Ababa, Ethiopia, 2022

	Un employee	131	59.5
Living states	Family	90	40.9
	Husband/wife	84	38.2
Marital states	Live alone	46	20.9
	Marred	93	42.9
	Un marred	129	56.4

#### 5.2. Clinical characteristics

A total of 210 study participants were included in the analysis, with 90 (41%) of the participants followed up for one month. Among the participants, the majority, 146 (66.7%), were on a first-line drug regimen, while 64 (29.2%) were on a second-line drug regimen. Prior to initiating highly active antiretroviral therapy (HAART), 200 (90.9%) of the participants had a CD4 count of less than 500 cells. After starting HAART, 103 (51.3%) still had a CD4 count of less than 500 cells. Regarding medication administration, 167 (75.9%) of the patients reported taking their ART at night.

	1	I	
	Frequency	Percentage	
1 month	84	38.2	
3 month	46	20.9	
6 month	90	41	
First line	146	66.7	
second line	65	29.2	
Third line	9	4.1	
>500	200	90.9	
< 500	20	9.1	
>500	113	51.4	
<500	107	48.6	
>1000	81	36.8	
<1000	139	63.2	
>1000	7	3.2	
<1000	113	96.8	
Morning	15	6.8	
Evening	167	75.9	
Both time	38	17.3	
Stage 1	203	92.3	
Stage 2	14	6.4	
Stage 3	3	1.3	
	1 month 3 month 6 month First line second line Third line >500 < 500 < 500 < 500 < 500 < 500 < 500 < 1000 < 1000 < 1000 < 1000 < 1000 Slove Evening Both time Stage 1 Stage 2 Stage 3	Frequency           1 month         84           3 month         46           6 month         90           First line         146           second line         65           Third line         9           >500         200           < 500	

#### 5.3. Treatment outcome

#### Level of Adherence

The overall level of poor adherence to HAART among the 220 study participants was 46 (20.9%). Poor adherence was relatively higher at Zewditu Memorial Hospital, with 31 (27.3%) of participants reporting suboptimal adherence, compared to Yekatit 12 General Hospital, where 24 (20.1%) exhibited poor adherence.

Variable	Zewditu HOSPITAL		Yekatit 12 hospital		Total	
	Frequency	Percentage	frequency	percentage	Frequency	Percentage

Poor Adherence	31	27.3	24	20.1	46	20.9
Good Adherence	69	72.7	86	80.9	174	79.1

Good

Adherence =79.1. Poor Adherence = 20.9% n



Figure 4.3: Level of adherence

#### 5.4. Factor Associated

#### Associated factors with poor ART adherence

The result of multivariate logistic regression analysis shows there is no association between factors determined in our questionnaire and poor adherence of patients taking H. AART

#### 6. DISCUSSION

In our country, the accessibility and affordability of drug treatments, along with improvements in confidentiality, have progressed year by year. These developments have significantly contributed to successful ART adherence, enhancing patients' quality of life and reducing the risks of medication resistance and treatment failure. The introduction of combined medication forms has also helped patients maintain better adherence.

A study conducted in Vietnam highlighted residence, smoking, and substance use as major factors contributing to suboptimal adherence [11]. Similarly, factors such as youth and unemployment were also associated with non-adherence [18]. In our study, 66.7% of participants were on first-line medications, and the results suggest that one of the factors influencing poor adherence is related to the use of this regimen.

Our findings indicate that 79.1% of participants exhibited good adherence, while 20.9% had poor adherence. This aligns closely with the findings from D. Akarr Se, Negal, where 80% of participants showed optimal adherence, with only 5.9% reporting suboptimal adherence and 14.9% being non-adherent [19]. Our study's results are comparable to those in the aforementioned study. Participants who had not disclosed their HIV status and those who did not experience drug side effects were more likely to maintain good adherence. Counseling before initiating ART was a key factor in promoting adherence. While most participants in our study received counseling before starting treatment, lack of follow-up counseling remained a barrier, leading to continued poor adherence for some.

Factors such as employment status, inadequate follow-up, lack of patient confidentiality [21], young age, unemployment, opportunistic infections, and urban residence [24] are widely recognized as major barriers to adherence. Interestingly, in our study, factors related to drug side effects, social behavior, and socio-demographic characteristics did not show a significant association with poor ART adherence.

#### 7. STRENGTHS AND WEAKNESSES

#### 7.1. Strengths

- We used a standard tool (MoRisky Adherence Scale) to assess the factors associated with poor adherence to HAART in patients.
- The study was conducted across multiple sites, providing a broader perspective and enhancing the generalizability of the findings.

- The questionnaire or checklist was pre-tested to ensure the quality and reliability of the questions, which directly contributed to the quality of the findings.
- The study highlighted important factors associated with poor adherence to HAART, and the data obtained may serve as a valuable baseline reference for ART practitioners and future research on this topic.

#### 7.2. Limitations

Several limitations should be considered when interpreting the results of this study. First, the sample size was relatively small, which may limit the ability to generalize the findings to the entire population. Second, the study employed a cross-sectional design, which assessed cause and effect simultaneously. As a result, causal relationships could not be definitively established due to the lack of a temporal connection between exposure and outcome. Finally, this study relied on a review of medical charts, which introduced inherent design limitations, such as incomplete data. These limitations could affect the accuracy and comprehensiveness of the information analyzed.

#### 8. CONCLUSION AND RECOMMENDATION

#### 8.1. Conclusion

Although the majority of study participants (79.1%) demonstrated good adherence to Antiretroviral Therapy (ART), 20.9% still exhibited poor adherence. Notably, the poor adherence rate was higher among participants attending care at Zewditu Memorial Hospital (27.3%) compared to those at Yekatit 12 General Hospital (20.1%). Despite examining several factors, our study found no significant association between these factors and poor ART adherence at either hospital. Further research is needed to explore and establish the potential relationships between poor adherence and these factors.

#### 8.2. Recommendation

For overall improvement in adherence to ART, we recommend the following, particularly based on this study:

- Health Education Programs: Hospitals should launch programs to provide health education aimed at changing patients' perceptions of their illness. Educating patients about the importance of adherence will not only improve their understanding but also enhance adherence to treatment. Further studies are needed to explore effective strategies in this regard.
- **Patient Education for First-Time Diagnosed Individuals:** Clinicians should focus on educating newly diagnosed patients about their disease and the critical importance of adhering to treatment regimens. Early education can help set the foundation for long-term adherence.
- Medication Reminders: Healthcare providers should encourage patients to develop systems, such as medication reminders, to help them consistently take their medications as prescribed. Simple tools like mobile apps, alarms, or pill organizers can support patients in maintaining adherence.
- **Increased Responsibility for Healthcare Professionals:** All healthcare professionals, particularly pharmacists, should take on more responsibility in providing detailed information about medication and the potential consequences of non-adherence. This can help patients better understand the importance of their treatment regimen and encourage them to follow it.

#### List of acronyms/ abbreviations

- > AIDS Acquired Immune Deficiency Syndrome
- > **ART** Anti-Retroviral Therapy
- > HAART Highly Active Anti-Retroviral Therapy
- > HIV Human Immunodeficiency Virus
- > **PDR** Pharmacy Drug Refill
- > PLWHIV People Living with Human Immunodeficiency Virus
- > SPSS Statistical Package for the Social Sciences

#### REFERENCE

- Ethiopia Public Health Training Initiative, The Carter Center, Ministry of Health, & Ministry of Education. (2006 E.C.). *Ethiopian Internal Medicine Lecture Notes for Health Officer* (2nd ed.). Available at: <u>https://www.cartercenter.org</u>. Accessed on April 23, 2022.
- 2) Food, Medicine and Health Care Administration and Control Authority (FMHACA). (2014 E.C.). *Ethiopian Standard Treatment Guideline for General Hospitals* (3rd ed.). Available at: <u>https://www.fmhaca.gov.et</u>. Accessed on May 2, 2022.
- Lailulo, Y., Kitonye, M., et al. (2020). Factors associated with anti-retroviral therapy treatment failure among people living with HIV in resource-poor settings: A systematic review and meta-analysis. *Systematic Reviews*, 9, 292. https://doi.org/10.1186/s13643-020-01524-1
- 4) UNAIDS. (2021). UNAIDS report on the global AIDS epidemic. Available at: https://www.unaids.org/sites/default/files/media\_asset/UNAIDS-fact-sheet.pdf. Accessed in 2022.

- 5) Aschilum, S.B., Tadesse, A.W., Urmale, M.K., et al. (2021). Level of nonadherence and its associated factors among adults on first-line ART. *PLoS ONE*, *16*(8): e0255912. https://doi.org/10.1371/journal.pone.0255912
- 6) World Health Organization (WHO). (2007, December). *ART failure and strategies for switching ART regimens in the WHO European Region*. Accessed on April 25, 2022.
- 7) Centers for Disease Control and Prevention (CDC). (2011, August). *HIV/AIDS Prevention Division*. Available at: <u>https://www.cdc.gov/hiv</u>. Accessed on April 25, 2022.
- 8) Adal, M. (2019). Systematic review on HIV situation in Addis Ababa, Ethiopia. *BMC Public Health*, *19*, 1544. https://doi.org/10.1186/s12889-019-7885-8
- 9) Ago, K.A., Oqua, D., Omonaiga, O., et al. (2011). Medication adherence and risk factors for non-adherence among patients on HAART. *Journal of West African Pharmacy*, 22(1), 19–26.
- 10) Homschuh, S., Dietrich, J.J., Tshabalala, C., Lager, F. (2017). ART adherence knowledge and experience among adolescents and young adults. *Journal of South Africa Research on AIDS Treatment*, 2017: 1–8. https://doi.org/10.1155/2017/9259256
- 11) Mai, H.T., Le, M.G., Tram, B.X., et al. (2018). ART adherence in the context of early treatment in Vietnam. *Patient Preference and Adherence*, *12*, 2131–2137. https://doi.org/10.2147/PPA.S175474
- 12) Calvetti, P.U., Giovelli, G.R.M., Gayer, G.J.C., Morales, J.F.D. (2014). Psychosocial factors and quality of life in ART adherence. *Journal of Brazil*, 63(1), 8–15.
- 13) Miyada, S., Harbin, A.J.I., Gatto, R.C.J., Garbin, C.A.S. (2017). Treatment adherence in HIV patients. *Journal of the Brazilian Society of Tropical Medicine*, *50*(5), 607–612.
- 14) Suryana, K., Suharsono, H., et al. (2019). Factors associated with ART adherence in Indonesia. *Journal of Indonesia*, *11*, 307–312. https://doi.org/10.2147/HIV.S219695
- 15) Andini, S., Waluyo, A., et al. (2019). Self-efficacy, depression, and ART adherence among women with HIV. *Journal of Indonesia*, 29(Suppl. 2), 687–690. https://doi.org/10.1016/j.enfcli.2019.04.105
- 16) Oliveira, L.S., Caixeta, L.M., Martins, J.L.R., et al. (2018). ART adherence, adverse effects, and co-infection. *Journal of the Brazilian Society of Tropical Medicine*, 51(4), 436–444. https://doi.org/10.1590/0037-8682-0467-2017
- 17) Dorcelus, L., Bernard, J., et al. (2021). Factors affecting ART adherence in Haiti. *Journal of Haiti Research on AIDS, 18*, 81. https://doi.org/10.1186/s12981-021-00405-4
- 18) Semvua, S.K., Orrell, C., Mmbaya, B.T., et al. (2017). Predictors of ART non-adherence in Tanzania. *PLoS ONE*, *12*(12), e0189460. https://doi.org/10.1371/journal.pone.0189460
- 19) Byabene, A.K., Deguenonvo, L.F., Niang, K., et al. (2017). CASE index score and virological suppression. *Tropical Medicine & International Health*, 22(6), 776–782. https://doi.org/10.1111/tmi.12882
- 20) Legesse, T.A., Reta, M.B. (2019). ART adherence in Hara town, Ethiopia. *Ethiopian Journal of Health Sciences*, 29(2), 299. https://doi.org/10.4314/ejhs.v29i2.2
- 21) Azial, N., Mukumbany, F.C., Vanwyk, B. (2016). Barriers to ART adherence. *South African Journal of HIV Medicine*, *17*(1), a476. https://doi.org/10.4102/sajhivmed.v17i1.476
- 22) Letta, S., Demissie, A., et al. (2015). Factors associated with ART adherence in Ethiopia. *BMC International Health and Human Rights*, *15*, 33. https://doi.org/10.1186/s12914-015-0070-x
- 23) Abadiga, M., Hansen, T., et al. (2019). ART adherence and associated factors. *PLoS ONE*, 15(5), e0232703. https://doi.org/10.1371/journal.pone.0232703
- 24) Nigussu, F.T., Mudzusi, A.H.M. (2020). Non-adherence magnitude in Benishangul Gumuz. *PeerJ*, 8, e8558. https://doi.org/10.7717/peerj.8558
- 25) Tessema, G.A., Kassa, H. (2014). ART adherence in children. BMC Public Health, 14, 365.
- 26) Anuradha, S., Joshi, A., et al. (2011). ART adherence under India's national program. *Indian Journal of Community Medicine*, *12*(3), 195–201. https://doi.org/10.1177/1454109711431344