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**ASSESSMENT OF LEVEL AND FACTORS AFFECTING  
ADHERENCE TO ANTIRETROVIRAL THERAPY IN NAGELLE  
TOWN, OROMIA REGIONAL STATE, ETHIOPIA**

TIGIST SOLOMON

June 2023

Addis Ababa

**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**

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TOWN, OROMIA REGIONAL STATE, ETHIOPIA**

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE  
STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL  
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SOCIAL PHARMACY

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**SCHOOL OF GRADUATE STUDIES**

This is to certify that the thesis prepared by Tigist Solomon entitled: Assessment of level and factors affecting adherence to antiretroviral therapy in Nagelle town, Oromia regional state, Ethiopia and submitted in fulfillment of the requirements for the degree of Masters of Science in Pharmacoepidemiology) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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## **Abstract**

**Introduction:** An adherence level greater than 95% is necessary to get a good outcome out of antiretroviral treatment, and adherence to antiretroviral therapy has also been the strongest predictor of the progression of outcome of antiretroviral therapy. This study intended to assess the level and factors affecting adherence to ART among HIV-infected adult patients in Nagelle town.

**Method:** A cross-sectional study employing both qualitative and quantitative methods was conducted from September 1-30, 2019. A systematic sampling method was used to select the study participants. A total of 285 questionnaires and review of medical records using a semi-structured questionnaire and information capturing sheet were included. Data entry and analysis were performed using SPSS for Windows version 21. Bivariate and multivariate analysis evaluated the association between dependent and independent variables. Thematic analysis was used for qualitative data.

**Result:** The research finding revealed that 69.8% of the study participants had good combined adherence to dose, schedule, and dietary instructions in the past month. Educational status ( $P=0.035$ ), presence of illness ( $P= 0.001$ ), use of other drugs ( $p=0.001$ ), absence of social support ( $p=0.017$ ), and use of alcohol ( $p=0.001$ ) were found to be significantly associated with poor adherence to ART. Having good relations with health care providers, the Perceived benefit of adherence by HCP, and long refill appointments were identified as facilitators of adherence. The barriers include stigma and discrimination, lack of skilled HCP, distance to health facilities, and use of other drugs.

**Conclusion:** This study found that participants' education status, presence of illness, use of other drugs, social support, and drinking alcohol were determinant factors that affect adherence to antiretroviral therapy. Interventions are recommended to improve the adherence of patients to antiretroviral therapy.

**Keywords:** - Adherence Antiretroviral therapy, 'adult patient's, HIV/AIDS, Nagelle Town 'Ethiopia.'

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## Abbreviation and acronyms

3TC	Lamivudine
AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral
ATV/R	Atazanavir/ ritonavir
AZT	Zidovudine
EFV	Efavirenz
HCP	Health Care Professionals
HIV	Human Immunodeficiency Virus
Lop/r	Lopinavir/ritonavir
MEMS	Medication event electronic monitoring system
NVP	Nevirapine
PLWHA	People Living with HIV/AIDS
SSA	Sub Saharan Africa
SNNPR	Southern nation nationalities and people region
TDF	Tenofovir
WHO	World Health Organization

# 1 INTRODUCTION

## 1.1 Background

Human immune deficiency virus (HIV) is one of the most significant destructive epidemics that continue to be a global public health problem (Abadiga et al., 2019). HIV infection was initially recognized in the early 1980 G.C., with the first two AIDS cases reported in 1986. Globally the number of people living with HIV continues to grow; for instance, 38.0 million people were living with HIV worldwide in 2018. Approximately 52% reside in sub-Saharan Africa (USAIDS, 2020). Ethiopia is one of the countries significantly affected by the HIV/AIDS epidemic in Sub-Saharan Africa. Since then, the HIV/AIDS epidemic has rapidly spread throughout the country and peaked in the mid-1990s (FHAPCO/FMOH, 2010). It is estimated that 1.1% of the Ethiopian population lives with HIV (PEPFAR Ethiopia, 2017). There has been wide variation in HIV prevalence among administrative regions and urban and rural settings. For instance, according to the Ethiopian Demographic and Health Surveys, HIV prevalence in the country ranges from 0.9% in Southern Nation Nationality and People Region (SNNPR) and 1.0% in Oromia Region to 5.2% in Addis Ababa and 6.5% in Gambella Region in 2011 (FHAPCO, 2012).

Antiretroviral therapy (ART) is a treatment for HIV that combines more than three different types of antiretroviral medications, which should be taken lifelong to prevent drug resistance to medications and make them effective. Access to ART in low and middle-income countries has expanded dramatically. Subsequently, ART coverage is increasing; as of the end of June 2020, 26 million people were accessing ART (USAIDS, 2020). In Ethiopia, at the end of 2019, 630 000 adults aged 15 and over living with HIV, and 76% had access to ART (USAIDS, 2020).

WHO defines adherence as "the extent to which a person's behavior- taking medication, following a diet, and executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (WHO, 2017). Non-adherences to ART refer to failing to take the medication correctly, taking it inconsistently, or missing doses. Non-adherence increases the frequency of opportunistic infections, faster progression of the disease, and a substantial decline in health for HIV-positive individuals. Non-adherence also reduces viral suppression, causing an increase in the risk of the viral strain quickly becoming drug resistant. Studies have found a strong statistical

relationship between the failure to obtain scheduled pharmacy refills and more rapid HIV disease progression to AIDS (Wondiye et al., 2016).

There are many key problems with in the study of adherence to ART, including precise measurement of adherence, assessment of the impact of adherence on viral load and clinical outcome, determination of the factors that influence adherence, and also the development of interventions. (Bangsberg, 2008). Addressing these problems may offer valuable data concerning those patients who are most at high risk for non-adherence and about how adherence might be improved. There are five basic techniques were developed for quantifying adherence, all of that have their own limitations (Bangsberg, 2008; WHO, 2017). In current study only, Patient self-reports and Pharmacy refill records were used to measures adherence level.

Patient self-report of adherence is a routine technique used in assessing adherence both in clinical trials and in routine clinic settings (Steel et al., 2007). These have the benefit of low price and flexibility of design (questionnaires suit individual language abilities). The data are simply collected and may help to determine the reasons why patients are non-adherent. They assume, however, that patients can accurately recall their behavior and are providing honest answers. The main limitation of self-reports is that they reflect solely short-term or average adherence and these might sometimes overestimate it. The other drawbacks of self-report are self-report is subjected to measurement biases such as social desirability, recall bias, and response bias (Shi et al., 2010). Despite the fact that patient self-report of adherence can predictably overestimate adherence by as much as 20%, a patient's report of non-adherence is a strong indicator of non-adherence and this must be taken seriously (Bangsberg, 2008; Steel et al., 2007).

Pharmacy-dispensing data is another potential approach used to routine adherence monitoring. Pharmacy refill information can be used to estimate the drug-possession ratio, which represents the maximum possible adherence for a patient over a well-defined refill period (Bangsberg, 2008). The relationship of pharmacy refill adherence and patient clinical outcomes has been well established (ElKhatib et al., 2011) The drawback of this approach is that numerous pharmacies can be used by the same patients, which in fact complicates data collection (Bangsberg, 2008).

The effectiveness of ART relies on strict adherence to it. In other words, loose compliance or non-compliance to ART can result in inadequate viral suppression, immunologic failure, rapid disease

progression, and the development of drug resistance. To avoid the emergence of resistant strains of the virus, WHO recommends at least 95% adherence to ART (WHO, 2017).

Based on these facts, the importance of adhering to ART has been widely exposed and accepted as a critical element in the success of ART. Even though access to ART is vital, ensuring the patient's adherence to the prescribed regimen is equally important (Abayneh et al., 2017).

Improving adherence requires collaboration with the patient to understand and improve individual awareness of adherence. This can generally be done by establishing a dedicated time to educate every patient, plan for adherence, and maintain support and collaboration throughout treatments. This way, adherence can regularly be assessed, problems can be averted, and side effects can be dealt with (Abayneh et al., 2017).

This study focuses on the assessment of the level of adherence and the determinant factors affecting adherence to antiretroviral therapy among adult patients infected with HIV in Nagelle town. This study did not include a population aged less than 18 years and did not assess the treatment outcome regarding quality of life.

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Based on these facts, the importance of adhering to ART has been widely exposed and accepted as a critical element in the success of ART. Even though access to ART is vital, ensuring the patient's adherence to the prescribed regimen is equally important (Abayneh et al., 2017).

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every patient, plan for adherence, and maintain support and collaboration throughout treatments. This way, adherence can regularly be assessed, problems can be averted, and side effects can be dealt with (Abayneh et al., 2017).

This study focuses on the assessment of the level of adherence and the determinant factors affecting adherence to antiretroviral therapy among adult patients infected with HIV in Nagelle town. This study did not include a population aged less than 18 years and did not assess the treatment outcome regarding quality of life.

## **1.2 Statement of the problem**

Adherence to antiretroviral therapy (ART) has been found as a major challenge in the treatment of HIV-infected patients both in developed and developing countries. To avoid the emergence of resistant strains of the virus, WHO recommends at least 95% adherence to ART. Based on these facts, the importance of adhering to ART has been widely exposed and accepted as a critical element in the success of ART (PEPFAR Ethiopia, 2017).

Non-adherences may be caused by failure of ART early in therapy and will become a cause of medication resistance late after therapy. Thus, evaluating and monitoring drug adherence is important to measure the efficacy of ART. The level of adherence of patients to ART varies in different situations. In Ethiopia, 76% of adult people living with HIV/AIDS (PLWHA) had access to ART (USAIDS, 2020). Even though access to ART is vital, ensuring the patient's adherence to the prescribed regimen is equally important (Abayneh et al., 2017). A meta-analysis of adherence levels found a pooled estimate of only 72.9% adherence level among PLWHA in Sub Sahara Africa (SSA) (Heestermans, 2016). One study in Oromia reported 72.3% adherence to more than 95% of doses. Bidu and Babure, 2018).

Ethiopian public health institute reports show that the prevalence of adult HIV/AIDS cases in Guji zone were (9000) in 2019, this was highest number in Oromia Regional State (EPHI 2019). Adherence level of ART and associated factors among PLWH are not well understood in Guji zone. Nagelle Town is located in low land and at boarder of the country different topographical and living culture compared to other zones in Oromia. The majority of population in area is pastoralist; they were affected by wasting and poor nutrition. In the Oromia region, specifically in Guji Zone, Nagelle town, no studies have been conducted to demonstrate the level of adherence in HIV-infected adult patients receiving ART and the determinants that might affect their adherence. Furthermore, adherence levels are dynamic and fluctuate over time. Therefore, this study aimed to assess the level of adherence and examine determinants affecting adherence to ART in HIV/AIDS patients in the town of Nagelle.

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Oromia Health Bureau and Nagelle Hospital report of 2017 shows that the prevalence of HIV/AIDS in Nagelle town was very high compared to other places in Oromia Regional State (ORHB, 2017). There is also a challenge related to the presence of O.I. drug contraband which results in irrational drug use. This may affect adherence to ART in addition to other factors. In the South Oromia region, specifically in Guji Zone, Nagelle town, no studies have been conducted to demonstrate the level of adherence in HIV-infected adult patients receiving ART and the determinants that might affect their adherence. Furthermore, adherence levels are dynamic and fluctuate over time. Therefore, this study aimed to assess the level of adherence and examine determinants affecting adherence to ART in HIV/AIDS patients in the town of Nagelle.

## **2 LITERATURE REVIEW**

### **2.1 Adherence to ART**

The WHO states that adherence to ART has been documented as an important component of treatment success in HIV patients taking ART. Adherence involves taking prescriptions at the correct dosage, on time, and as directed. In contrast to other chronic illnesses, ART requires extremely high levels of adherence (> 95%) to be successful over the long term and to stop the formation of virus strains that are resistant to it. Poor adherence is associated with greater mortality, lower CD4 cell count growth rates, lower rates of undetectable viral loads, lower treatment success, and more extended hospital stays (WHO, 2017). The level of adherence must be greater than 95% to get the best outcome out of ART and delay disease progression. Adherence to antiretroviral therapy has also been documented as the second strongest predictor of progression to AIDS and death after CD4 count in PLHIV receiving treatment (Machtinger & Bangsberg 2006).

Studies on drug adherence established that higher levels of ART drug adherence are associated with improved virological, immunological, and clinical outcomes. A lower CD4 count and increased mortality rates are also associated with poor antiretroviral medication adherence. (Mitiku et al., 2013; Negesa et al., 2017).

Although near-perfect adherence is required for better and long-term clinical benefits, incomplete adherence prevails in all groups of treated individuals. The average rate of adherence to ART remains approximately 70%. The concern of suboptimal adherence was recognized as a major obstacle to the scaling up of antiretroviral therapy in resource-limited settings due to the risk of developing drug-resistant strains and transmission to the population. The continuity of HIV treatment is also emphasized in 5 terms maximizing the efficacy, extending the period patients spend on the first-line ART regimen, and reducing the risk of developing drug resistance and treatment failure (Ejigu et al., 2014; Negesa et al., 2017).

For instance, since the inception of large-scale ART access early in this decade, ART programs in Africa have retained about 60% of their patients at the end of two years, with loss to follow-up as a major cause of attrition, followed by death. The percentage of loss to follow-up varies widely across programs and ranges from 3.7 to 44% in resource-limited settings. Therefore, greater attention should be given to ensuring improved patient retention in ART programs and enhancing adherence behavior for the ultimate benefit of the population in general and HIV-infected patients in particular. (Machtinger & Bangsberg 2006).

## **2.2 Factors affecting adherence to ART**

Adherence to ART can be influenced by the characteristics of the patient, the regimen, the clinical setting, and the provider/patient relationship. To ensure drug adherence, the patient must get and understand information about HIV disease, the aim of therapy, and the specific regimen prescribed (Sahay et al., 2011).

### **2.2.1 Patient factors**

Patient factors studied to affect adherence include; socio-demographic factors such as gender, ethnicity, age, employment, income, education, and literacy; and psycho-social factors like active drug use and alcohol use, degree of social support, social stability, depression, and other psychiatric illness. Socio-demographic factors do not seem to adherence behavior. Also, some studies found that male sex, white ethnicity, older age, higher income, and higher education correlate with better adherence (Wattakosol et al., 2010; Sahay et al., 2011).

A patient's knowledge about his/her medication regimen and patients understanding of the relationship between non-adherence and buildup of resistance to medication also predict better adherence (Dahab et al., 2008). Age is reported in some studies to be a determinant for adherence, with a risk of non-adherence seen in older patients (>25 years) compared with younger patients (Bidu and Babure, 2018). However, other studies reported the opposite in which older age (>46 years) corresponds to adherence (Letta et al., 2015; Tsega et al., 2015).

Lower levels of education corresponded with non-adherence, and higher adherence is observed among patients with formal education (Ejigu et al., 2014; Abera et al., 2015; Belayihun and Negus, 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018)

Substance use (alcohol, chat, tobacco product) increased the risk of non-adherence. Suggested reasons were that patients use alcohol to cope with depression and hopelessness, and they may forget to take their medication as a consequence of alcohol use (Demeke B, 2014; Ejigu et al., 2014; Abera et al., 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018; Koyra, 2018)

Non-adherence was higher in unemployed people (Tsega et al., 2015). Similarly, higher income was associated with adherence (Letta et al., 2015).

Food insecurity and restriction resulted in non-adherence through two mechanisms: stopping ART when food was unavailable to avoid aggravated side effects or because taking ART when insufficient food is available increased hunger (Belayihun and Negus, 2015; Bidu and Babure, 2018).

Most psycho-social factors are consistently associated with adherence, including psychological distress, active substance use, social support, and knowledge and beliefs about HIV and its treatment (Machtinger and Bangsberg, 2006).

Disclosure of one's serostatus to a friend, co-workers, and/or family members was significantly associated with adherence to HIV medications. Those patients who did not disclose their HIV status were at higher risk of suboptimal adherence (Demeke, 2014; Letta et al., 2015; Tsega et al., 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018). Studies showed that disclosure of HIV status to one's spouse was associated with better adherence. Fear of disclosure and social stigma were associated with non-adherence (Waite et al., 2008; Birbeck et al., 2009). The fear of social stigmatization and disruption in social networks may usually complicate the disclosure of one's HIV serostatus. Studies showed that a high level of social stigmatization was an independent predictor of ART non-adherence (Waite et al., 2008).

Depression was a predictor of non-adherence and included reasons such as 'ready to die' and 'loss of hope of ever getting better (Letta et al., 2015; Tsega et al., 2015).

Other factors reported to be linked with non-adherence like distance to the clinic, number of sexual partners, forgetting to take medication, hospital versus government ART initiative, traveling and living situation (Mitiku et al., 2013; Demeke, 2014; Ejigu et al., 2014; Abera et al., 2015; Letta et al., 2015; Tsega et al., 2015; Fituma and Nigatu, 2016; Abayneh et al., 2017; Negesa et al., 2017; Bidu and Babure, 2018; Koyra, 2018).

Further patient factors that strongly affect adherence include being busy, missing an appointment, fasting, and sleeping (Demeke, 2014; Abera et al., 2015; Abayneh et al., 2017).

### **2.2.2 Medication factors**

ART consists of a complex regimen with multiple daily dosing and specific food and fluid-related instructions. These are often difficult to follow for patients and contribute to poor adherence/non-adherence; the higher the pill burdens, the lower adherence. ART medication often has side effects, some of which are temporary, while others may become permanent or long-lasting. Studies revealed that patients who experience side effects tend to stop treatment or not take it as prescribed (Reisner et al., 2009; Sahay et al., 2011). The study finding indicated that the type of ARV regimen, the number of ARV pills per day, and other medications other than ART were associated with adherence or non-adherence to ART. There was a difference in the adherence level between patients taking TDF 3TC EFV and TDF 3TC NVP/ AZT 3TC NVP and patients taking two or three ARV pills per day. Patients taking TDF 3TC EFV were more adherent than another regimen (Demeke, 2014; Ejigu et al., 2014; Abera et al., 2015; Ketema and Weret, 2015; Abayneh et al., 2017; Bidu and Babure, 2018; Koyra, 2018).

Other studies also documented that a higher number of pills and more frequent dosing schedules had been associated with non-adherence to treatment (Jean-Baptiste R, 2008). This indicated that patients taking fixed-dose combination drugs tended to be more adherent than those taking multiple combined ARV drugs. This may be due to the simplicity of the regimen contributing to

the reduction of frequency, side effects, and pill burden of the TDF 3TC EFV, a daily regimen of one pill/day. This indirectly promotes the adherence of patients to their treatment.

### **2.2.3 Patient-provider relationship**

The patient-provider relationship is important in improving adherence to prescribed medication in chronic disease. It is believed to be a motivating factor for adherence to ART. Trust and confidence in the provider have been found to influence adherence positively. Communication barriers were thought to contribute to poor adherence. Provider felt that these primarily affected patients who speak a language different from their providers (Reisner et al., 2009). Those patients with a positive perception of items related to the patient-provider relationship were more likely to have better adherence than those with a negative perception. A confidential and good association with HCP resulted in good adherence to ART. Non-adherence was seen when patients encountered unpleasant experiences with HCP (Ejigu et al., 2014; Negesa et al., 2017; Bidu and Babure, 2018). Another study also illustrates that the perceived quality of the patient-provider relationship was associated with adherence (Watt et al., 2010).

This implies that a positive relationship with HCP may lead to better adherence, as patients could feel free to discuss various problems related to taking their medications without fear and discomfort. Consequently, healthcare providers may develop specific measures for individual patients in addressing problems that may impact proper medication adherence. Evidence shows that patient's overall satisfaction, willingness to involve patients in the decision-making process, and positive relationships significantly affect adherence to HIV medications (Machtinger and Bangsberg, 2006).

### **2.2.4 Disease characteristics**

Disease characteristics include the WHO clinical stage and disease duration (HIV infection), associated opportunistic infection, and HIV-related clinical symptoms (Machtinger and Bangsberg 2006). Being healthy or not sick after taking ART treatment was reported as both barriers to and facilitators of adherence (Mweemba et al., 2010, Sturt et al., 2010). Studies demonstrated that

patients with a baseline CD4 count greater than 200 cells per microlitre had an increased risk of non-adherence to ART (Sarna et al., 2008; Campos et al., 2010; Beer et al., 2012).

The WHO HIV clinical stage was found as an independent predictor of adherence in a study done in Ethiopia (Tiyou et al., 2010). Another study revealed that patients with asymptomatic WHO clinical stages or no clinical symptoms tend to adhere poorly (Campos et al., 2010). A study in Zambia indicates WHO clinical stage at baseline did not predict non-adherence to ART (Chi et al., 2009). Duration of time since knowing HIV serostatus is another important factor influencing adherence. A study conducted in Rwanda revealed that adherent patients had known their HIV serostatus for a short period than non-adherent patients (Jean-Baptiste, 2008). Another study also presented that an increased number of years since HIV diagnosis is independently associated with poor adherence (Beer et al., 2012). However, other studies demonstrated the absence of an association between adherence and the time of HIV diagnosis (Aragones et al., 2011). Another factor that may influence adherence includes the time since ART started. Lal et al. (2010) demonstrated an association between times since starting ART and adherence. Another study by Venkatesh et al. (2010) indicated that patients who experienced ART for over two years tend to have lower adherence. In the opposite of this study, taking ART for more than two years was related to adherence in high-income countries (Gari et al., 2013).

### **2.2.3 Clinical setting/health system**

The aspect of the clinical setting may have been associated with improved adherence. A friendly, supportive, and nonjudgmental attitude of HCP, convenient appointment scheduling, and confidentiality contribute to better adherence. Most patients interviewed felt that clinic waiting was too long. This contributes to their disappointment with clinic service and makes them more likely to stop coming to the clinic to get their medication on time. Again, despite an association being natural clinical studies that address the relationship between the clinical setting and adherence behavior are very inadequate. Disappointment with previous experience in the health care system has been linked with non-adherence to medication (Sturt et al., 2010; Machtinger and

Bangsberg, 2011). The studies suggested that the level to which patients believe health providers keep their medical secrets, the convenience of appointment schedules,

Another important finding of the study was that participants who had convenient appointment schedules for HIV medication refills were more adherent than those who did not (Negesa et al., 2017). Another study pointed out that regular attendance of patients was associated with adherence (Chalker et al., 2010).

### **3 OBJECTIVES**

#### **3.1 General objective**

To assess the adherence of HIV/AIDS-infected adult patients to antiretroviral medicines and associated factors in Nagelle Town, Oromia Regional State.

#### **3.2 Specific objectives**

- To determine the level of adherence of HIV/AIDS-infected adult patients to antiretroviral therapy in Nagelle town.
- To identify the factors affecting adherence to antiretroviral therapy among adult HIV/AIDS patients in Nagelle town
- To explore factors that could affect patients' adherence to their antiretroviral therapy from the providers' perspectives

## **4 METHODOLOGY**

### **4.1 Study area, settings, and period**

The study was conducted in Guji Zone, Oromia Region, Ethiopia. Nagelle town is 605 km from Addis Ababa, the capital city of Ethiopia, in the southern part of the country. Nagelle town is Located in the Guji Zone of the Oromia Region. It is the largest town in the Guji Zone, about 1,475 meters above sea level, with a moderated hot semi-arid climate. Nagelle general hospital is the only one that gives clinical services to about 1.5 million people in the catchment area. There were 2100 PLWHA patients on treatment follow-up at Nagelle Hospital and 400 HIV/ AIDS patients at Nagelle health center ART clinic at the time of the study. There were 17 medical doctors, 37 nurses, 22 midwives, 13 pharmacists, five health officers, 24 nurses, six midwives, and one druggist working in this hospital and health center, respectively. The most common diseases reported in the hospital were bacterial intestinal infection, pneumonia, and acute upper respiratory infection. The data was collected from September 3 to September 30, 2019.

### **4.2 Study design**

An institution-based cross-sectional concurrent explanatory mixed design was used. Quantitative and qualitative data related to the level of adherence and factors affecting adherence were collected using a semi-structured questionnaire from PLWHA HIV/AIDS patients on ART and key informants (pharmacists and other health care professionals).

### **4.3 Source population and study population**

The source population of this study consists of HIV-infected adult patients receiving antiretroviral therapy in Nagelle Hospital and the health center.

**Inclusion criteria:** PLWHA those older than 18 years, those who had been receiving ART for at least two years, and those who gave their consent to participate in the study

**Exclusion criteria** those PLWHA who taken ART for less than 2 years, those who were under 18 years of age and those who were part of the pre-test were excluded.

#### 4.4 Sample Size Determination

The sample size is determined by using single population proportion formula by considering adherence proportion from systematic review and meta-analysis, which pooled estimate of adherence to antiretroviral therapy in SSA, was found to be 72.9% (Heestermans, 2016).

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

$$n = \frac{1.96^2 * 0.729(1 - 0.729)}{0.05^2}$$

$$n = 304$$

Where Z value = 1.96, n= sample size, p = prevalence, d = margin of error).

Since the population number is known from ART clinics, N (total target population) = 2500, is less than 10,000, the sample size should be corrected using the formula.

$$n^f = \frac{n}{1 + n/N}$$

$$n^f = \frac{304}{1 + 304/2500} \quad n^f = 271$$

The initial sample size is 271, and by considering a 10% non-response rate, the final sample size was 298 using a precision of 5% and a 95% confidence interval

For qualitative data the enrollment of HCP continued until information saturation was achieved. The research investigator invited all ART pharmacist, ART nurses, ART focal person of each facility and community pharmacist to participate in study.

#### **4.5 Sampling technique**

. A sampling frame for each facility was established from the list of HIV-infected adults receiving ART, fulfilling the eligibility criteria.

The study participants were then sampled from a sampling frame of a list of eligible adult HIV-infected patients on ART based on their unique ART identification numbers, which were generated from a computer database. A proportionate number of the total sample size was determined for each facility depending on the number of ART clients receiving treatment in these facilities. With this, from 298 sample sizes, the proportionate number allocated for the hospital and health center were 223 (75%) and 75 (25%), respectively. Then, the sampling interval was calculated by dividing the population by the sample size for each facility.

As a starting point, the first sample was selected randomly from the first ten eligible patients from the ordered list of sampling frames. Then, the sampling interval was calculated by dividing the population by the sample size for each facility. Finally, every 8<sup>th</sup> HIV-infected adult on ART from the sampling frame was identified and selected for participation in the study from 223 Nagelle general hospital and 75 study participants from the Health Centre. Finally, 298 participants planned to be interviewed, and 13 questionnaires were rejected because of their incompleteness. The rest 285 questionnaires were analyzed.

For qualitative data collection, five informants were interviewed from health facilities (an ART clinic doctor, a pharmacist from an ART pharmacy, an ART clinic nurse, and two pharmacists from a health center and community pharmacy).

#### **4.6 Data collection procedure**

The researcher approached the staff in charge of the data in the ART clinics to get the data of ART users on the computer with their direct assistance

The data was collected by interviewing study participants using a semi-structured questionnaire developed from the Adult AIDS Clinical Trial Group (AACTG) adherence questionnaire (Chesney

et al., 2000) and the Life Windows Information-- Motivation Behavioral Skills ART Adherence Questionnaire (LWIMB-AAQ) (Torija et al., 2015) and review the patient's records and pharmacy refill records. Data collectors (two pharmacists from the study facility) were trained and deployed to collect data by interviewing the selected study participants attending the ART clinic in Nagelle general hospital and Nagelle health center. The data collectors were trained on the study's objective, applying the ethical aspects, obtaining informed consent, ethically treating participants based on their willingness, and how to complete the questionnaires and keep them confidential. The investigator closely follows and supervises the data collection process to ensure and guide proper data collection. This also helped to minimize the occurrence of variations and errors in the data during data gathering. The researcher provided the consent form and the questionnaire prepared in Afan Oromo and the necessary stationary materials to the data collectors. With the assistance of the staff, the investigator found a room in each of the facilities for the data collectors to interview the study participants in private. The list of study participants was used to identify the patients when they came to the ART clinic to pick up their ARV medications during the data collection period. The nurses facilitated the referral of the study participants willing to participate to the data collectors. The data collectors explained the purpose of the study and read the written consent form to the study participants, and then written informed consent was obtained from a participant when he/she was willing to participate. Those study participants who could write and read were given the consent form and allowed to complete it by themselves. Following this, the data collectors interviewed the participants within the allocated schedule. The average time utilized for the interview was 15 minutes for each participant. Since the researcher wanted to minimize biases, as the data collection took place in the health facilities, the data collectors were told not to wear gowns so that the participants could provide genuine responses during the interview. The researcher closely supervised the process and supported the data collectors to ensure the data collection was done correctly.

Finally, the researcher collected and reviewed the completed questionnaires (218 from Nagelle Hospital and 67 from the health center). The qualitative data were collected through key informant interviews.

## 4.7 Development and testing of the data collection instrument

Most of the items of the questionnaire were adapted from the widely used Adult AIDS Clinical Trial Group (AACTG) adherence questionnaire (Chesney et al., 2000) and the Life Windows Information-- Motivation Behavioral Skills ART Adherence Questionnaire (LWIMB-AAQ) (Torija et al., 2015) with some modifications to fit the context of the research setting for example, How often do you drink alcohol modified as "Have you ever had a drink containing alcohol?"

Most of the questions were closed-ended. The questionnaire was prepared in English and translated into Afan Oromo, a widely spoken official language in Oromia Regional State.

## 4.8 Operational definitions

- **Combined adherence** - The combined adherence was estimated by giving scores, which included the sum of the scores from each of the criteria, which scored 5 points and classified adherence as good or poor.
- **Good adherence**- taking medicines strictly as recommended  $\geq 95\%$  in a month or score 19 and above from 20
- **Poor adherence** Not taking medicines strictly as recommended or taking  $< 95\%$  in a month or scores below 19 from 20
- **ART**- It refers to the combination of ARV drug regimens used to treat patients infected with HIV.
- **Good knowledge and Poor knowledge**- good knowledge was estimated by giving scores to each question, which included the sum of the scores from each of the question which have score of 5 point and classified good, or poor, those who scored 20 and above were considered as having good knowledge and those who scored below 19 considered as poor knowledge about HIV disease and ART.

## 4.9 Study Variables

**Dependent variable**-The primary outcome measure was adherence level.

**Independent variables**-The independent variables were sex, age, marital status, educational status, occupation, duration on ART, CD4 count, WHO stage, type of ART regimen, other drug use, and disclosure status.

#### **4.10 Data analysis procedure**

The data were cleaned, coded, and entered into a computer. The analysis of all the data was done by using 21 versions of SPSS statistical software. The data analysis incorporated both descriptive and inferential statistics. Descriptive statistics such as mean, median, and standard deviations were calculated to describe the basic participants. Odds ratio, chi-square test, and 95% confidence interval were computed to identify the presence and strength of associations between the categorical independent and dependent variables. After checking model fitness using the Hosmer-Lemeshow test, variables with a P-value of less than 0.25 were inserted in the model to carry out multiple logistic regression analyses to identify factors associated with low adherence to antiretroviral therapy. The association of dependent and independent variables was statistically significant, with a p-value less than 0.05.

#### **4.11 Data quality assurance**

A semi-structured questionnaire was prepared in English, translated into Afan Oromo (local language), and back-translated to English by language experts to increase measurement accuracy. Training and orientation were given to the data collectors, and close supervision was done during data collection. Every day the collected data was reviewed and checked for completeness and consistency of the response. The qualitative data quality was checked by investigators and member cross-checking.

Before data collection, all data collectors were trained and had a similar concept of the questionnaire, and after data collection, the collected data were checked for completeness and accuracy of the information before analysis. In addition, the data was carefully entered into SPSS software for analysis. More than one investigator was involved in this study: the principal

investigator and the two supervisors. Furthermore, both qualitative and quantitative methods were used to triangulate the findings.

Moreover, before data collection began, the questionnaire was pre-tested in a small group (5% of the sample size) of HIV-positive individuals on antiretroviral therapy. The data collection instrument was refined based on the pre-test experience. Some mandatory questions, such as "How many doses did you miss in the past month? Did you take the medication on the schedule agreed with HCP? and "Do you follow special dietary instructions related to your medication? were added.

#### **4.12 Ethical considerations**

Ethics approval was obtained from the Research Ethics Review Committee of the School of Pharmacy, Addis Ababa University (ERB/SOP/9/04/2010, May 29, 2019) and the Oromia Regional Health Bureau. (BEFO /HBF2/1—16/1275, 29 9 2011) Besides, permission to conduct the study was also obtained from the respective health facilities where the study was undertaken. Privacy and confidentiality of information were ensured at all level. Respondents were asked for their willingness to participate on the study. The purpose of the study was clearly explained for the respondents, and their participation depended on their willingness. The study participants were approached by pharmacists working in the ART pharmacy in each health facility. All respondents' data was anonymized to maintain confidentiality.

## **5 RESULTS**

This section has two parts quantitative findings part and qualitative findings part. Two hundred ninety-eight participants planned to be interviewed. The response rate of participant's was 100% and 13 questionnaires were rejected because of their incompleteness. Finally, 285 questionnaires were analyzed for quantitative data and 5 key informants response were analyzed for qualitative data.

### **5.1 Part I Quantitative findings**

#### **5.1.1 Socio-demographic characteristics of the respondents**

The mean age of the respondents were 38.25 years, and the range extending from 18 years to 68 years with standard deviation of 11.489. Females comprised about 60.7% of the study participants and about 80% were married. Concerning literacy status, above half of the participants (58.5%) are educated. The mean monthly income level of the participants was 1000 ETB with a range of 0 to 10,000 Ethiopian birr. Concerning occupation, only 30.5% of participant is employed. Of total participants, 46% were orthodox Christian religion followers (Table 1).

Table 1: Socio-demographic characteristics of the study participants, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Age</b>		
<b>18-25</b>	40	14
<b>26-35</b>	86	30.2
<b>36-45</b>	90	31.6
<b>≥46</b>	69	24.2
<b>Gender</b>		
<b>Male</b>	112	39.3
<b>Female</b>	173	60.7
<b>Marital status</b>		
<b>Never married</b>	56	19.6
<b>Married</b>	134	47
<b>Divorced/separated</b>	50	17.5
<b>Widowed</b>	45	15.8
<b>Educational status</b>		
<b>Unable to read &amp; write</b>	13(4.5)	23(8)
<b>Read and write only</b>	10(3.5)	34(11.9)
<b>Primary</b>	78(27.3)	23(8)
<b>Secondary &amp; tertiary</b>	89(31.2)	15(5.5)
<b>Family monthly income</b>		
<b>≤1200</b>	179(62.8)	62.8
<b>1201-2500</b>	41(14.4)	14.4
<b>&gt;2500</b>	65(22.8)	22.8
<b>Occupation</b>		
<b>Employed</b>	87(30.5)	30.7
<b>Un employed</b>	198	69.3
<b>Religion</b>		
<b>Orthodox</b>	131(46)	46
<b>Protestant</b>	55(19.3)	19.3
<b>Muslim</b>	79(27.7)	27.7
<b>Catholic</b>	6(2.1)	2.1
<b>Wakefata</b>	14(4.9)	4.9

### 5.1.2 Knowledge about HIV and ART medication

The study participants were asked to state to what extent they agreed or disagreed with the statement assessing their knowledge on HIV disease and ART medications. As indicated in Table 2 below, 60.4% participants had good knowledge about how their HIV medications were supposed to be taken. Only 43.5% of the participants knew what to do if they missed their doses. In this study 61.2% of study participants have good knowledge about HIV/AIDS disease, ART and ART adherence Table 2: Knowledge about HIV disease and ART and their adherence in Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

Question	Yes Frequency (%)
Knows how to take their medication	172(60.4)
Knowing What to do if dose missed	124(43.5)
Knowledge on consequence of skipping medication	222(77.9)
Knowledge on side effects	131(46)
Knowledge on missing the drug time to time and its health effect	218(80)
Understanding on how the HIV medications work in the body	151(52)
Belief on ART	270(94)
Interaction of medicine with substance like alcohol and other drugs	214(75.1)

### 3.1.3 Disclosure status and social support of study participants

The study participants were also asked questions related to disclosure and social support. Close to 60% disclosed their status to others; from those who disclosed their status, only 4.7 study participants were not supported by their family and/or friends.

Table 3: The study participants' disclosure status and social support, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

Variable	Frequency	Percent (%)
Disclosure		
Yes	170	59.6
No	115	40.4
Social support		
Yes	162	95.3
No	8	4.7
Satisfaction with support		
Satisfied	139	48
Dissatisfied	11	3.9
Neither satisfied nor dissatisfied	22	7.7

### 3.1.4 Drugs and substance use habit of study participants

Table 4 shows that, out of the 285 study participants, 61.1% had never taken alcoholic beverages in their lifetime. The majority (76.5%) claimed that they did not drink not drink alcohol the past month. The smoking pattern among study participants was 27.4% smoked cigarettes every month, only 17.2% had a history of smoking last month, 45.6% of study participants chewing chat in their life time while 32.3% chew chat last month. Almost half of the participants use non-prescribed over counter drugs or prescription drugs. Most of them confirmed that illegal /contraband drugs

were available in that area, 40% of them thought taking those illegal /contraband drugs did not affect their ART adherence.

Table 4: The study participants' drug and substance use habits, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

<b>Variable</b>	<b>Yes Frequency (%)</b>	<b>No Frequency (%)</b>
Have you ever had a drink containing alcohol?	111	174(61.1)
Have you had a drink within the past month?	67(23.5)	218(76.5)
Have you ever smoked cigarette?	78(28.4)	207(72.6)
Have you smoked within the past month?	49(17.2)	236(82.8)
Have you ever chewed chat?	130 (45.6)	155(54.4)
Have you chewed it within the past month?	92(32.3)	193(67.7)
Have you ever taken medicine or other drugs not prescribed for you?	142(49.8)	143(50.2)
Do you think that illegal /contraband drugs are available in this area?	193(67.7)	92(32.3)
Do you think taking these illegal/contraband drugs affects your ART adherence?	171(60)	114(40)

### **3.1.3 Clinical Conditions of study participants**

As summarized in Table 5, 61.8% of the participants had reported that they were not sick past month before the interview date and OIs were the most reported among illnesses among those who had health problems. About half (44.2% of the study participants were 6-10 years after being diagnosed. Around half (45.6%) of the study participants were 6-10 years since started ART. Most study participants (54.4%) were in WHO stage III during ART initiation. Concerning their baseline CD4 count, 58.9% of study participants were in range of 250- 500. At the same time, the latest CD4 count of study participants were more than 500 in 11.9 %.

Regarding ART regimen and Frequency, 58.6% of study participants were on triple FDC of TDF3TCEFV, a once-daily dose regimen. Of the participants, 77.5% were on their initial ART

regimen, while the rest were on a changed ART regimen. 81% of study participants used other drugs concurrently with ART whether prescribed by HCP or other over counter drugs.

Table 5: The study participants' clinical condition and ART regimen, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

Variable	Frequency	Percent (%)
Illness in past month		
Yes	109	38.2
No	176	61.8
Type of illness		
IO	68	23.9
Chronic	29	10.1
Others	12	4.2
Time since diagnosed		
2-5 years	80	28.1
6-10 years	126	44.2
> 11 years	79	27.7
Time since ART initiation		
2-5	99	34.7
6-10 years	130	45.6
> 11 years	56	19.6
Clinical stage		
I	9	3.2
II	77	27
III	155	54.4
IV	44	15.4
The baseline CD4		
<250	83	29.9
250-500	168	58.9
>500	34	11.9
Latest CD4		
<250	18	6.3
250-500	118	41.4
>500	149	52.2
ART change		
Yes	64	22.5
Other drugs use with ART		
Yes	142	49.8

### **5.1.5 Perception of the patient-provider Relationship and Clinical setting of Participants**

The majority of the study participants positively replied that they got the correct information about taking HIV medications, that they could easily discuss their problems with HCP, that HCP understood their problems in taking their ART medication and often helped them to solve their problems, and that majority (92.6%) were satisfied with the overall care and support provided by HCP (Table 6).

Table 6: Perception on patient-provider relationship and Clinical setting of the study participants, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

<i>perception of participant toward HCP and Clinical setting</i>	<i>Positive Frequency (%)</i>	<i>Negative Frequency (%)</i>
<i>The health care providers give you appropriate information about taking your medications.</i>	231(84)	54(19)
<i>It is easy for you to discuss problems related to your medication with the health care providers</i>	271(9.64)	13(5.4)
<i>The HCP understand the problems you may have taking your ARV medications</i>	269(94.9)	16(5.7)
<i>The health care providers often help you in solving the problems you may have taking medications.</i>	269(94.3)	16(5.7)
<i>You are satisfied with the overall support you get from the health care providers</i>	259(89.9)	26(9.1)
<i>You are convenient with the scheduling appointments to your medication refill</i>	203(71.3)	82(28.7)
<i>You believe that health care providers keep your health-related information confidential</i>	227(79.6)	58(20.2)
<i>You have encountered frequent missed clinic appointments.</i>	161(56.5)	124(43.5)
<i>You have never got a problem to your medication refill related to ARV drug supply</i>	259(90.9)	26(9.1)
<i>You are well satisfied with the overall health care services delivered by the health facility</i>	264(92.6)	21(7.4)

### 5.1.7 Adherence level and determinant factors affecting adherence

This study assessed the participants' adherence level using a self-report and medical record review method. The participants were asked to report whether they missed ARV doses, how many doses they missed, if they followed their medication schedules, and if dietary instructions were agreed upon with health care providers in the past month. Their medical record was reviewed last year to check if they collect their medication on time. The combined adherence was estimated by giving scores, including the sum of each variable's scores, and classifying adherence as good or poor. Accordingly, combined adherence level in this study was 69.8%. The distribution of participants by adherence criteria in the past month is presented in Table 7.

Table 7: Distribution of participants, by adherence criteria in the past month, Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

Combined adherence	Frequency	Percent
Good adherence	199	69.8
Poor adherence	86	30.2
schedule adherence		
Good	250	87.7
Poor	35	22.3
special instructions (dietary instruction)		
Good	228	80.0
Poor	57	20.0
Dose adherence		
Good	221	77.5
Poor	64	22.5
Collect medicine on time		
Yes	143	50.2
Missed dose		
Yes	233	81.8

### **5.1.3 Reason for missing ART medication**

Half (50.2%) of study participants missed one or more doses of their ARV medications in the past month. They were asked about the reasons for missing their medication. The most common reason mentioned was stigma (35.8%). This was followed by forgetfulness (34.4%), feeling sick (19.3%), not fully understanding the regimen and its instructions (18.2%), traveling away from home (17.9), and transportation problems to go to the clinic (Table 8).

Table 8 Reasons for missing doses of ARV medications in the past one-month Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=233).

<i>Reason</i>	Never, N (%)	Rarely, N (%)	Sometimes N (%)	Often N (%)
<i>Wanted to avoid side effect</i>	190(81.8)	8(3.5)	19(8.4)	615(6.3)
<i>Could not follow dietary instructions</i>	162(69.5)	7(2.8)	34(14.4)	31(13.3)
<i>Sharing ART medication with others</i>	176(75.8)	4(1.7)	22(9.5)	30(13)
<i>You forgot</i>	136(58.2)	1(0.4)	16(7)	80(34.4)
<i>Religious belief</i>	167(71.7)	34(14.4)	10(4.4)	22(9.5)
<i>Not fully understanding the regimen and its instructions</i>	164(70.5)	3(1.4)	22(9.8)	42(18.2)
<i>Travel away from home</i>	184(78.9)	2(0.8)	7(3)	41(17.9)
<i>Transportation problems getting to the clinic</i>	190(81.8)	1(0.4)	3(1.4)	(16.5)
<i>Felt sick or ill</i>	181(77.7)	2(0.8)	7(3)	43(18.45)
<i>Fear of stigmatization or being discriminated</i>	138(59.3)	4(1.7)	8(3.3)	83(35.6)
<i>Busy and sleeping</i>	144(61.8)	71(30.6)	7(3)	11(4.7)

### **5.1.4 Factors that influence adherence to antiretroviral therapy**

In bivariate logistics regression, educational status ( $P=0.035$ ), presence of illness ( $P= 0.001$ ), uses of other drugs ( $p=0.027$ ), social support ( $p=0.001$ ), Latest CD4 ( $p=0.035$ ) and Patient perception toward HCP and clinical setting ( $p=0.154$ ) use of alcohol ( $p=0.011$ ) Smoking cigarette ( $p=0.063$ ) Chewing chat ( $p=0.145$ ) were negatively associated with adherence to ART care at  $p<0.25$ . These covariates were moved to the multivariate logistics analysis, and a significant association was considered at  $p<0.05$ .

Multivariate logistic regression showed that participant whose education level of read and write & primary level had 52% and 12% less likely had good adherence of ART drug respectively compared to education level of secondary and tertiary level (AOR=0.48, 95%CI=0.11, 0.73, AOR=0.88, 95%CI=0.24, 0.87). Participant who has no illness in the past month had 3.7 times more adherent to ART drug compared to its compartment (AOR=3.73, 95%CI=1.24,5.88) while participants haven't family/friend's support were 83% less likely had good adherent to ART drug (AOR=0.17, 95%CI=0.081,0.362) and participant who didn't drink alcohol had 1.9 times adherent to ART drug compared to those of alcohol user (AOR=1.9, 95%CI=1.88, 4.11). Participant who was not used unprescribed drug were 1.5 folds adherent to ART drug when compared to those use unprescribed drug (AOR=1.497, 95%CI=1.21,3.077)

Table 9: Factors significantly associated good adherence to ART Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=285).

<b>Variable</b>	<b>Adherence level</b>		<b>COR (95%CI)</b>	<b>AOR (95%CI)</b>	<b>P value</b>
	good adherence (≥95)	Poor-adherence (<95)			
<b>Educational status</b>					
Unable to read & write	13(4.5)	23(8)	0.09(0.56,3.12)	0.042(0.88,12.21)	0.075
Read and write only	10(3.5)	34(11.9)	0.05(1.34,6.21)	0.48(0.11, 0.73)	0.042
Primary	78(27.3)	23(8)	0.57(1.59,6.89)	0.88(0.24,0.87)	0.035
Secondary & tertiary	89(31.2)	15(5.5)	1		
<b>Illness in past month</b>					
<b>Yes</b>	58(53.2)	51(46.8)	1	1	0.001
No	141(80.1)	35(19.9)	3.54(1.911,4.995)	3.73(1.24,5.88)	**
<b>family/friend's support</b>					
Yes	140(49.1)	23(8)	1	1	0.001
No	53(18.5)	45(15.7)	0.19(0.18, 0.87)	0.17(0.081,0.362)	**
<b>Drink alcohol</b>					
Yes	68(61.3)	43(38.7)	1	1	0.017
no	131(75.3)	43(24.7)	1.926(1.152,3.222) *	1.904(1.883, 4.106) **	
<b>Uses of drugs not prescribed</b>					

Yes	143(50.2)	107(74.8)	1		
No	142(49.8)	72(50.7)	1.47(1.038,5.194)	1.497(1.21,3.077)	0.001

\*COR  $p < 0.25$  AOR\*\* $p < 0.05$  at CI 95%

## 5.2 Part II: Key informant interview

Five key informants were interviewed from health facilities (an ART clinic doctor, a pharmacist from an ART pharmacy, an ART clinic nurse, and on druggist from a health center and on pharmacist from community pharmacy). Three health care providers were female. Face-to-face interviews using interview guide were conducted. Each interview took 20 to 25 minutes. The interview assessed the personal experiences, subjective perspective of HCP about ART adherence and HCP perspective on the problem of non-adherence and factors affecting adherence in Nagelle Town.

Table 10 Health care professionals involved in interview from Nagelle hospital, Health Centre and one community pharmacy in Nagelle Town Oromia Regional State Ethiopia, September 2019 (n=5).

Profession	Age in years	Level of education	Position	Experience with ART (year)
Physician	28	MD	ART clinic focal person	2
pharmacist	37	Bpharm	ART pharmacist	5
Nurse	55	BSc	ART nurse	20
pharmacist	45	Bpharm		10
Druggist	34	Diploma		5

## **5.2.1 The factors associated with adherence to ART**

Five health workers were interviewed: three Nagelle hospitals, one health center and one from a community pharmacy. Three health workers were female. All the key informants agreed that adherence is a problem in patients taking drugs for a lifelong period. They reflected that non-adherence to ART is observed in patients on ART in their town. Participants also agreed that some gaps in the counseling practice might negatively affect adherence. They were also explained that their patients fear taking the drug (ART) due to stigmatization in the community. The study revealed many facilitators and barriers to ART adherence at individual, family/friends, community, and health system levels. These factors are described along with descriptive quotations from the key informants.

## **5.2.2 Facilitators of adherence to ART**

### **5.2.2.1 Healthcare providers-patient relationships**

Participants reported a good relationship with their patients involved in their adherence enhancement. They explained that healthcare providers encourage patients to take their medications and attend the clinic on schedule. Patients' trust in HCPs and their guidance motivates PLWH to adhere to their ART medication. A key informant expressed her relationship with the patients as follows:

*“I would approach all of them friendly, support them if they had a problem at any time, call them if they were lost to follow up, and sent informal caregivers to their home to trace them and they felt respected, and their hopes increased, and they believed more in their treatment.” (A woman, nurse, worked >20year)*

*“Pharmacists have to be responsible to those who need our help, but the problem is the patients (ART) are not transparent, and they could not expose their status to us even if we ask. These were disabling the patients to derive support from others morally and financially. “In this case, we have to create awareness about ART adherence by counseling” (Male pharmacist > ten years' experience)*

HCP emphasizes that improving patients' awareness of ART adherence is vital. Accordingly, accessing and evaluating ART treatment adherence to the HIV positive individual is a crucial component which needs HCP supports.

### **5.2.2.2 Perceived Benefit of Adherence by HCP**

Healthcare workers recognize the importance of ensuring adherence to ART to suppress viral replication, improve immunological status, reduce viral transmission to uninfected people, and prolong patient life. Improving patients' awareness to adhere to ART adherence rate is vitally important. The participants agreed that counselling is so important that it would help the patients morally and in reminding schedule of taking drugs.

*"Healthcare workers' interventions were vital in preventing and reducing drug-related problems and improving patient adherence to ART." (A male, GP, worked two years)*

### **5.2.2.3 Long Prescription Refill Time**

According to the key informants, long distances from ART sites and transport costs are significant challenges to refilling ART medicines which negatively affects adherence. Hence refilling prescriptions for a long time (6 months) facilitates patient adherence. *"Prescribing for a long time, like four months or months, is good for those patients coming from a long distance, so we prescribe for good adherent patients for six months; hence no need to come every month unless they have viral load measurements so that they come on schedule and refill their ART and their viral load is also good." (A Male, GP, worked two years)*

## **5.2.3 Barriers to adherence to ART**

### **5.2.3.1 Lack of skilled HCP**

Inadequate training of HCP, lack of communication about ART among HCPs, lack of counseling skills, and patient follow-up were reported as barriers to adherence. Health workers mentioned the lack of trained staff working against PLHIV. They felt they are not competent to provide care and

support to PLHIV. The participant believed there was a need for more training to increase the capacity of interventions on ART adherence.

“I now work in ART pharmacy but am not trained for basic ART services. I approach ART patients like any other, which may affect their adherence. I need more training to increase my capacity for assessing, reviewing, supporting, evaluating, and monitoring ART adherence.” (A woman, druggist, worked five years)

### **5.2.3.2 Distance to health facilities**

Healthcare providers agreed that distance was a big concern, particularly for ART patients from remote areas, and traveling distance to and from ART sites remained challenging adherence issue. This was supported by a key informant as follows:

*"For some, they need to walk for more than a half day to refill their medicine; the transport cost is almost 600 Birr. This may remain a major reason for some individuals not to the health facility to refill their prescriptions on schedule" (A male, GP, worked two years)*

### **5.2.3.3 Stigmatization and discrimination**

Most participants mentioned that patients experienced some forms of discrimination and HIV-related stigma or fear of stigma, which influence adherence. Fear of rejection by their family or community creates fear of exposure, affecting adherence to ART. Some healthcare providers interviewed also noted that PLWH selected sites to take ART where no one would know them.

*“Due to stigma, some of the patients did not regularly come to collect their drugs; instead, they sent others on their behalf because they feared that their HIV status would be exposed. Other patients were also not comfortable being seen by people while collecting drugs over the counter owing to fear of disclosure to the public. As a result, they did not listen to all instructions and counseling while standing near the dispensing sites. Rather they hurried to collect the drugs and leave that area”. (A Woman, druggist, worked five years)*

*“In this area, HIV seems to be a disease for only the poor or low-income communities because other people went to other areas like Hawasa and to avoid stigma; some patients sold their ART drugs to those who fear coming to the hospital to avoid people/ their friends knowing their status.” (A male pharmacist worked over ten years)*

Participants expressed that patients’ fear being seen at the clinics or pharmacies where they collect their medication. The fear of rejection by their family or community generated a fear of exposure, affecting adherence. Patients were afraid to be identified as HIV patients when visiting the ART clinic for fear of rumor. This fear influences attending the clinic; hence pill refills and antiretroviral adherence.

*“There are cases I know, who are on ARV therapy, they collect ARV drugs by removing the packaging materials, putting it in other drug packs, or asking for labels with different drug names to use ARV drugs in the family, if there is somebody in clinic whom she knows she did not come or return without refilling her drug” (A women, nurse, worked >20year).*

#### **5.2.3.4 Uses of drugs**

The use of non-prescribed contraband drugs is one of the most discussed themes in this study. All respondents believe in the presence of contraband drugs in this area. Because they access drugs everywhere without a prescription, PLWH takes those drugs without a prescribed by an authorized body which also affects their adherence.

*“There were illegal drugs such as ant pain, antibiotic, and antifungal drugs sold in the town without prescription. They buy it and take it without any consultation with professionals. With ART, this adds pill burden and side effects and might also have drug-drug interaction with ART. This affects patient adherence in multidirectional”. (A woman, pharmacist, worked > 5 years)*

Respondents also reported that when they felt better and stopped taking their ART, they believed that taking other drugs from the market would provide a long-lasting solution.

*“Some patients may not come to the hospital for simple conditions like headaches. Rather they buy drugs called ‘relief’ from a private pharmacy.” (A woman, nurse, worked > 20 years)*

## **6 DISCUSSIONS**

This study assessed patients' ART adherence level and the factors associated with their ART adherence in Nagelle Town, Oromia Regional State, Ethiopia.

The study revealed that the level of adherence to a dose of 95% and more, schedule, and instruction to dietary requirements in the past month were found to be 77.5%, 87.5%, and 80%, respectively. The overall combined level of adherence to all indicators was 69.8%. This means that 69.8% of participants fulfilled an optimal/reasonable adherence requirement of taking  $\geq 95\%$  of the prescribed ARV drugs at the specified schedule and according to the agreed dietary instructions with HCP. Therefore, 30.2% of participants could be at a higher risk of developing drug resistance and treatment failure, which necessitates the need to have a strategy that helps to address the predictable problems of high-risk patients towards better treatment follow-up and adherence.

This study was lower than the findings of similar studies in Ethiopia, which reported an overall adherence of 79.3% to 96.9% (Amberbir et al., 2008; Ejigu et al., 2014). However, this result is higher than that of a study by Aberra et al. in Jimma, whose adherence level was 63.81% (Aberra et al., 2015). Furthermore, the findings of this study are comparable to different studies carried out in developing countries. The probable reason for this difference may be the differences in assessment methods instance, patient medical review and lifestyle of the study population in a current study, which is pastoralist.

This study also revealed that stigma (35.8%); forgetfulness (34.4%), feeling sick (19.3%), and travel away from home (17.9%) were the most common reasons for patients to miss their ARV pills in the past month. Besides, stigma, discrimination, and long distance from ART sites were mentioned as contributors of missing the ARV pills. Adherence counseling should look into these

factors to improve it. Consistent with this finding, several studies also mentioned the above reasons for missing one's ARV pills (Jean-Baptiste, 2008; Markos et al., 2008; Tiyou et al., 2010; Watt et al., 2010; Wasti et al., 2012; Mitiku et al., 2013; Aberra et al., 2015; Tsega et al., 2015; Nagesa et al., 2017; Koira et al., 2018). This would emphasize the need for regular counseling of patient to disclose their status so that they do not fear taking the drug in front of others, which support good adherence to ART.

This study identified the determinant factors affecting adherence to antiretroviral therapy among adult HIV/AIDS patients in Nagelle town. In this study, factors such as educational status, presence of illness, use of alcohol, use of another drug, long distance to health service, and lack of skilled HCP were identified as a barrier to adherence to ARV medication. While, factors such as social/family support, patient-provider relationship, and long refilling time were identified as facilitators of adherence to ART.

The study findings suggested that educational status was significantly associated with combined adherence level {AOR 8.356(2.61,23.149 P=0.035)}. The possible justification could be, being education might increase their awareness and access to HIV therapy. This result is similar to that of a study done in another area in which lower levels of education corresponded with non-adherence, and higher adherence is observed among patients with formal education (Ejigu et al., 2014; Abera et al., 2015; Belayihun and Negus, 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018). However, other studies conducted by Birbeck et al. and Cauldbeck et al. reported that the literacy status of HIV-infected patients was not statistically associated with their medication adherence (Birbeck et al., 2009; Cauldbeck et al., 2009). On the other hand, socio-demographic variables such as age, sex, religion, occupation, and average family income were not associated with adherence to ART. This in agreement with different studies which documented the absence of a statistically significant association between socio-demographic variables and adherence to ART (Sarna et al., 2008; Birbeck et al., 2009; Cauldbeck et al., 2009; Venkatesh et al., 2010; Aragonés et al., 2011; Abera et al., 2014). This shows that it may be challenging to identify patients at risk of non-adherence based on their demographic characteristics.

The relationship between factors related to the clinical conditions of the study participants and adherence level was also examined. These factors include the experience of illness in the past month, duration of time since HIV diagnosis, duration on ART, WHO clinical staging, baseline and recent CD4 counts, and change of ART medications. The findings indicated that experience of illness in the past month was significantly negatively associated with adherence to ART {AOR 3.73(1.24,5.88) P= 0.001}. A possible clarification might be that when patients have an illness, they might have a pill burden, unable to refill on schedule. As a result, they might miss ART drugs as they give more attention to the acute illness. Similarly, another study reported that having symptoms in the past month was associated with non-adherence (Markos et al., 2008). This could be associated with the difficulty of having proper clinic follow-up due to sickness. This suggests that HCP should be cautious in evaluating and treating patients and provide them with support and counseling to help them adhere to their treatment. Besides, patients require more psychosocial support from families and/or friends and the community, especially when they get sick. The other variables, such as duration of time since HIV diagnosis, duration on ART, WHO staging and baseline, and current CD4 count, were not statistically associated with adherence in this study. Similar studies documented consistent findings (Chi et al., 2009; Aragonés et al., 2011).

This study also examined the association of certain psychosocial factors with adherence to ART. As a result, it was revealed that social support was significantly associated with increase in adherence level {AOR=0.17(0.081, 0.362) p=0.001}. Participants with strong family/friends support were found to be more adherent to their ART than those with low family/friends support. The presence of support from family/friends is a facilitator for adherence to the ART medication. This might be because those who disclosed their status were supported financially and morally. Support from family/friends has direct, immediate, and indirect long-term positive impacts on their adherence. It has been essential to disclose one's HIV status to others from whom patients may get the necessary support to utilize health care services and appropriate treatment properly. The fear of social stigmatization and discrimination in social networks may complicate serostatus disclosure. It also provides a comfortable situation for sharing experiences and support. Social support boosts the individual's confidence and makes it easy to adhere to ART. This study indicated that social stigma and discrimination are

significantly predictors of medication non-adherence. Disclosure and social support from relatives and the community have been essential to deal with patients' problems taking ART medications.

On the contrary, if a patient does not have support from family/friends, it becomes difficult because the condition makes them hopeless and increases the possibility of stopping ART treatment. As discussed earlier, this may be directly related to disclosing their HIV status to support others and discussing their medications. Thus, HCP have to pay attention to helping patients to disclose their HIV status and getting their friends and/or family to collaborate with them as part of the team in the clinical care of the patients. Similar to this study, other study findings documented that social support was significantly associated with adherence (Amberbir et al., 2008; Aragon's et al., 2011). According to Tiyou et al., lack of support from a partner was significantly associated with non-adherence.

The association of the use of substances such as alcohol with the combined adherence level of patients was investigated in this study. A significant association was found between the use of alcohol in the past month and combined adherence level {AOR=1.904(1.883, 4.106) p=0.017}. Alcohol consumption is believed to be a sign of a lack of control, making ART adherence more difficult. It would be essential to address issues related to substance use (alcohol) in the ongoing counseling of patients, as it may help patients take their ART medications correctly. A similar study also showed that substance use (alcohol, chat, tobacco product) increased the risk of non-adherence (Demeke B, 2014; Ejigu et al., 2014; Abera et al., 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018; Koyra, 2018).

The study pointed out that patients who use drugs which are not prescribed to them or from contraband sources did not adhere to ART compared to those who did not use these drugs {AOR=1.497(1.72,3.077) p=0.001}. The use of other drugs other than prescribed by HCPs may have problems due to quality issues, pill burden, and drug-drug interaction with ART. It would be essential to address these issues by ongoing counseling of patients as it may help patients take their ART medications correctly. A similar study also showed that substance and drug use increased the risk of non-adherence (Demeke B, 2014; Ejigu et al., 2014 Abera et al., 2015; Fituma and Nigatu, 2016; Bidu and Babure, 2018; Koyra, 2018).

The association between the study participants' perception of patient-provider relationship/clinical settings and adherence to ART was examined. The majority of the study participants positively responded that they got the correct information about taking HIV disease and medications; they replied that they openly discussed their problems with HCP, and HCP understood their problems in taking their medication and often helped them to solve their problems. In the key informant interviews, HCPs reiterated that perception of aspects related to the patient-provider relationship is associated with adherence to ART. Those patients with a positive perception were more likely to have better adherence than those with a negative perception. The reason behind this might be that patients become sensitive if the confidentiality of information about their health status is not assured, and sharing information carelessly may result in stigma and discrimination. A positive relationship with HCP may contribute to better adherence as patients could feel free to discuss various issues related to taking their medications without fear and discomfort. This was supported by a study illustrating that the perceived quality of the patient-provider relationship was associated with adherence (Watt et al., 2012). In other studies, non-adherence was seen when patients encountered unpleasant experiences with HCP (Nagesa et al., 2017; Bidu and Babure, 2018).

Despite the good relationship between HCP and patients, this study also revealed a shortage of skilled/trained HCP. PLWH had to seek treatment from an un-trained HCP who simultaneously provided treatment to non-PLWH. This affects the quality of service, primarily the proper counseling, due to a lack of proper training among healthcare providers. Patients with poor knowledge of ART concepts due to no or low-quality counseling were at increased risk of non-adherence to medication. This finding is supported by a systematic review done by Heestermans et al., (2016).

This study also revealed that patients who come from long distances frequently missed clinic appointments and were more likely to have poor adherence than those who had not. The possible reason for this might be that the patient cannot appropriately follow their appointment for medication refills, they may miss their medication, and this will result in non-adherence. Similarly,

some other studies supported the association between missing clinic appointments and non-adherence (Cauldbeck et al., 2009; Watt et al., 2010; Tsega et al., 2015). This finding is similar to the study conducted in Harari, Ethiopia, the odds of non-adherence of adults living at a distance was greater than 10km and above from the ART clinic were more than two times compared to those residing nearer to the clinic (Mitiku et al., 2013).

The convenience of the medication refill schedule was associated with improved adherence in this study. As mentioned by participants, patients who come from long distances from ART sites might benefit from long period refill (4 months) so they could not miss their refill appointment. This is because they only come to refill twice or thrice a year. Similarly, another study shows that participants who had convenient appointment schedules for HIV medication refills were more adherent than those who did not (Negesa et al., 2017).

## 7 CONCLUSION

A high level of adherence (> 95%) will be required to have sustainable viral load suppression and improve clinical outcomes according to WHO recommendations.

The level of adherence documented in the present study was 69.8% which was lower than the WHO recommendation, and the findings of other similar studies in Ethiopia

HIV Patients may often give several reasons for missing their ART medications. This study revealed that stigma, forgetfulness, and feeling sick traveling away from home were the most common reasons patients missed their ARV pills in the past month.

Educational status, presence of illness, patient knowledge of HIV/AIDS and ART, perception of the patient toward HCP/clinical settings, presence of support from family/friends, and uses of alcohol and other drugs were among the factors affecting ART adherence in this study.

The determinant factors identified as facilitators of adherence are good relations with HCP, the perceived benefit of adherence by HCP, and long refill appointments. The barriers include stigma and discrimination, lack of skilled HCP, distance to health facilities, and concomitant use of other drugs.

## 8 RECOMMENDATIONS

This study has come up with essential findings on the level of adherence and identified factors affecting the adherence of adult HIV-infected patients to their ART in Nagelle town. Based on the result of the study, the following recommendations have been made:

- Policymakers and other stakeholders should consider strategies that capacitate professionals and support health facilities and PLWHA.
- While HCP usually counsel and educate their patients before ART initiation and later on, particular emphasis should be given to those patients who had no formal education, are sick while taking ART, on conveniences of clinic appointments, and the effect of alcohol and other drugs on ART adherence and the disease progression.
- The health sector management in that area should regulate drug availability in the community through informal market and educate the community about problems related to these black-market drugs.
- Stigma and discrimination are major factors contribute non-adherence to antiretroviral treatment adherence, this can be reduced through family and community education.
- PLWHA travel long distances and complain economic constraint. Government should provide clinic extension in deliberate locations as a means of bringing treatment closer to PLWHA.

## **9 LIMITATION**

This study combined qualitative and quantitative data to determine the level and factors for adherence. It is, however, not without limitations. Since it is a cross-sectional design, finding a temporal relationship between cause and effect was impossible. The present study also had limitations regarding its generalizability. The qualitative data were collected only from HCP, the study could not able to explore factors affecting adherence from PLWHA perspective.

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## **Annex I      Informed consent form**

**Dear Participant,**

My name is Tigist Solomon, a Masters student in Pharmacoepidemiology and Social Pharmacy at Addis Ababa University School of Pharmacy. As part of this degree I am conducting a research. The research I am conducting is Assessment level and factors affecting adherence to ART in adult PLWHIV in Nagelle Town. The purpose of this study will be to assess the level of adherence to antiretroviral therapy and factors affecting adherence to ART among HIV infected adult patients. Ethical approval will be obtained from AAU, ORHB. Permission to conduct the study will be obtained from the health institution. A participant is selected just by chance from computer based data and data will be collected by interviewing using a questionnaire. It will take you 15-20 minutes to complete the interview. You are allowable to ask questions at any time about the study. Your participation in the study will be voluntary; there is no obligation to participate. You have full right to withdraw from the study at any time if you feel uncomfortable or stressed.

The study will benefit the participants from the recommendations that may result in improving adherence interventions based on the result. There will not be significant risks associated with participation in the study except time taken for interview. You will not receive any payment or other compensation for participation in this study.

The study data will be coded and it will not be linked to your names or any other identifiers. The information you provide will be kept very confidential and it will not be shared to anyone without your permission.

I will have understood this consent form and voluntarily consent to participate in the study.

Date: \_\_\_\_\_

Participant's signature: \_\_\_\_\_

Interviewer's signature: \_\_\_\_\_

## Annex II Questionnaire English version

I would like to appreciate your willingness to participate in the study. The purpose of the study will be to assess the level of adherence to antiretroviral therapy and its determinant factors among HIV infected adult patients. You are kindly requested to provide genuine responses to the questions listed below. I need you to understand that all your responses are valuable and will be kept confidential. I need to have your patience as it will just take about 15-20 minutes to complete the questionnaire. Please do not hesitate to ask any question about this study.

### Part I: Demographic variables

1. Age (in years): \_\_\_\_\_
2. Sex
  - 1-Male
  - 2-Female
3. Marital status
  - 1-Never married
  - 2-Married
  - 3-Divorced
  - 4-Widowed
4. Literacy status
  - 1-Niether neither read nor writes
  - 2-Read only
  - 3-Read and write
  - 4-Grade 1-8
  - 5-Grade 9-12
  - 5-Tertiary (12+)
5. Occupation: 1Employed (Government, private, NGOs)  
2- Housewife 3. Jobless 5- Others, specify \_\_\_\_\_
6. Religion:
  - 1-Orthodox

2-Protestant

3-Muslim

4-Catholic

5-wakefata

6-others, specify—

7. Average family monthly income in ETB: \_\_\_\_\_

6- Report of illness in the past one month

1-Yes

2- No

7- Type of illness \_\_\_\_\_

### **Part 2: Adherence**

1. Did you miss taking any of your ART medications in past one month?

1-Yes

2-No

2. If yes to Q 1 how many dose do you miss in past one month?

1- One dose 2- two dose 3- three dose 4 four and above

3. Do you take the medication in schedule agreed with HCP?

1-Yes

2-No

4. Do you follow special dietary instruction related to your medication

1-Yes

2-No

5. What were your reasons for missing any of your ART medications within the past month and how often have you missed taking your medications?

<b>Reason</b>	<b>Never</b>	<b>Rarely</b>	<b>sometimes</b>	<b>often</b>
Wanted to avoid side effect				
Could not follow dietary instructions				
Sharing ART medication with others				
You forgot				
Religious belief				
Not fully understand the regimen and its instructions				
Travel away from home				
Transportation problem getting to clinic				
felt sick or ill				
Of fear of stigmatization or being discriminated				
Other reason? Please specify below				

**Part 3. Knowledge about HIV disease and antiretroviral therapy**

Questions	Strongly disagree	Disagree	Neither agree nor disagree	agree	Strongly agree
I do know how each of my current HIV medications is supposed to be taken.					
I do know what to do if I miss a dose of any of your HIV medications.					

Skipping a few HIV medications from time to time would not really hurt my health.					
I do know what the possible side effects of each of my HIV medications are.					
As long as I am feeling healthy, missing my HIV medications from time to time is ok					
I do understand how my HIV medications work in my body to fight HIV.					
I do believe that if I take my HIV medications as prescribed, I will live longer					
I do know how my HIV medications interact with substances such as alcohol and other drugs					

**Part 4: Questions regarding social support**

1. Have you disclosed your HIV status to your friends &/or family members?

1-Yes

2-No

2. Do you have a family/friend that supports taking your medications?

1-Yes

2-No

If no, please skip to question no 5.

3. How satisfied are you with the support you get from your friends and/or family members?

1-very dissatisfied

2-somewhat dissatisfied

3-neither dissatisfied or satisfied

4-somewhat satisfied

5-very satisfied

4. How often do your friends and/or family members help you remember to take your medication?

1-Never

2-Sometimes

3-Most of the time

4-Always

5. Do you use any method to remind taking your ARV medication?

1-Yes

2- No

**Part 5: Perception on patient provider relationship and Clinical setting**

Questions	Strongly disagree	disagree	Neither agree nor disagree	agree	Strongly agree
The health care providers give you appropriate information about taking your medications.					
It is easy for you to discuss problems related to your medication with the health care providers					
The HCP understand the problems you may have taking your ARV medications					
The health care providers often help you in solving the problems you may have taking medications.					
You are satisfied with the overall support you get from the health care providers					

You are convenient with the scheduling appointments to your medication refill					
You believe that health care providers keep your health related information confidential					
You have encountered frequent missed clinic appointments.					
You have never got a problem to your medication refill related to ARV drug supply					
You are well satisfied with the overall health care services delivered by the health facility					

**Part 6: substance use and non-prescribed drug use**

- 1 Have you ever had a drink containing alcohol?                      1= Yes                      2= No  
     If yes, have you had a drink within the past 1 month?      1= Yes                      2= No
- 2 Have you ever smoked cigarette?                                      1= Yes                      2= No  
     If yes, have you smoked within the past 1 month?            1= Yes                      2= No
- 3 Have you ever chewed khat?    1= Yes                      2= No  
     If yes, have you chewed it within the past 1 month?        1=Yes                      2= No
- 4 Have you ever take medicine or other drugs not prescribed for you?      1= Yes      2= No
- 5 Where you get those drugs? 1=governmental HF 2= private pharmacy 3= others specify
- 6 Do you think that illegal /contraband drugs are available in this area? 1= Yes      2= No
- 7 Do you think taking of these illegal/contraband drugs affect your adherence to ART? 1= Yes  
 2= No

----- THANK YOU! -----

### **Annex III Questionnaire (Afan Oromo version)**

Hirmachuu kessaniif galatooma, gaffilee kana fixuun dakiika 15-20 caala isin hin tursu kanaafuu obsanii akka naaf debistanif yoo gaffii qabattan gafachuuf dandeessu.

**Kuta I: gaffii walii gala eenyuma hirmaataa**

8. **Umrii:** \_\_\_\_\_
9. **Korniyaa** 1- dhiira 2-dhalaa
10. **Akkata ga'eelaa** 1-kan hin fuunee/heerumnee 2-kanga'eelaqabuu/qabduu  
3-kan hiikee/hiiktee 4-kan irra/jalaadu'ee/tee
11. **Sadarkaa barnoota** 1-kan hin barressine fi hin dubbisne 2-dubbisuu qofa  
3-dubbisuuf barreessuu 4-kuta 1-8  
5-kuta 9-12 6- kuta 12 fi isaaolii
12. **Hojii:** 1 kan qacarame, (motumma, dhunfaa, NGO) 2-haadha warraa  
3. hojiihin qabuu 5-kan biraa \_\_\_\_\_
13. **Amantaa:** 1-Ortodoksii 2-Protestantii 3-Musliimaa 4-katolikii 5-waqeefataa  
6-kan biro \_\_\_\_\_
14. **Galiiji'aakanmaatii:** \_\_\_\_\_
- 6- Ji'a darbee kana sidhukkubee turee? 1-eeyyee 2- lakkii

**7- Gosa dhibee/mallatto dhibee** \_\_\_\_\_

**Kuta2: akkata fudhanna qarichaa waliin walqabatee**

- Ji'a darbee kana qoricha osoo hin fudhanne dabarte jirtaa? 1-eeyyee 2- lakkii
- Yoo gaffii armaaniin oliitiif deebiin kee eeyyee ta'ee hammani hin fudhannee?  
1.kan yeroo tokkoo 2. Kan yeroo lamaa 3. Kan yeroo sadii 4. Kan yeroo afur fi isaa olii
- Akkaataa siif ajajameen yeroo isaa eegdee ni fudhatta?  
1- eeyyee 2- lakkii
- Ajaaja adda nyaata fi qoricha keen walqabatee ogeessi fayya siif kennuu ni eegdaa?  
1- Eeyyee 2-lakkii

5. Sababoota qorichaa akkaata ajaajameen akka hin fudhannee taasisanii fi yeroo hammami akka ta'aani

<b>Sababa</b>	<b>tasu maa</b>	<b>Yeroo muraasa</b>	<b>Darbee darbee</b>	<b>Yeroo baay'ee</b>
Miidha qorichi Narran gahu hambisuuf				

Qajelfama nyaata waaliin fudhatamu nattii himame hin hordofuu				
Namaa biraaf qoricha kannuu(qooduu)				
Irranfachuu(dedhuu)				
Sababa amantaaf				
qajelfama haala itti fayyadama qoricha irratti hubanno gahaa hin qabuu				
Mana korra fagoo waan jiruuf				
Rakkon gejjiba waan jiruuf				
Waan dhukkubsadheef				
Namni akka na hin argineef/sodaadheet				
Sababni bira yoo jiraatee				

### kuta3. Hubanno dhibee HIV fi qorichaa farra HIV/AIDS

Gaaffiiwwan	Walihi ngaluu	Yaadahi nqabuu	agreewa liigalaa
Qorichia naaf kenname tokkon tokko isaa akkamitti fudhatamuu akka qabu nan beekaa			
Qoricha yoon irranfadhe maal gochuu akka qabu nan beekaa			
Qoricha muraasa irranfachuun rakko homaa fayyakoo irratti hinqabuu			
.miidha qorichi narraan gahuu dandaa'uu nan beekaa			
Hanga dhibeenatti hin qoricha osoo hin fudhatin irra darbuun rakko hin qabuu			
Akkataqorichifarra HIV qaama koodhibee irra ittisuu hubannoqabaa			

Akkata naaf ajajameen yoo qoricha farra HIV fudhadhee umrii dheera akka jiraadhu nan amanaa			
Walitti bu'iinsi qoricha farra HIV fi wantoota akka alkooli fi qoricha biragiddu jiraachu nan beeka			

#### **kuta 4: Deggarsa hawaasaa**

1. Dhiigaa kee keessaa vayrasiin HIV akka jiruu fi qoricha akka fudhattu maatii ykn hiriya keettitti himtee jirtaa? 1-eeyyee 2-lakkii
2. Maatii ykn hiriya akka atii qorichaa fudhattuuf sideggaru qabdaa? 1-eeyyee 2-lakkii
3. Yoo deebiin kee gaaffi ffa eeyye tahee, deggarsa amaatiin ykn hiriyonni kee siif godhaniitti itti quufteejirtaa?  
1-baa'ee itti hin quufnee      2-Hamma ta'ee itti hin quufnee 3-homaa  
4-Hamma ta'ee 5-baa'ee itti quufeera
4. Maatiin ykn hiriyonni kee qoricha kee yaadattee akka fudhattuu hammam sideggaru?  
1-homaa    2-yeroo tokko tokko    3-yeroo baa'ee    4-yeroo hundumaa
5. Qoricha keeyadachuuf malli itti fayyadamtu jiraa(alarmii)? 1-eeyyee 2- lakkii

#### **kutaa 5: Ilaalcha yaalamaan ogeessa fayya fi kenna tajaajila fayya irratti qabuu**

<b>Gaffiwwani</b>	<b>Walihi ngaluu</b>	<b>Yaadahi nqabuu</b>	<b>walii galaa</b>
Ogessi fayyaa waa'ee qorichaa odeeffanno gaha siif kennera			
Rakko qorichaa keen walqabatee simuudatu furuuf ogeessa fayya waliin mari'achuun si hin rakkisuu			
Ogessi fayyaa rakko qoricha fudhchuu wajjin walqabate simudatu siif ni hubataa			
Ogessi fayya yeroo baay'ee rakko qoricha fudhchuu wajjin walqabate simudatu hiikuuf si gargaara			

Waluma agalattii deggarsa ogeessa fayya irraa argattu itti quuftee jirtaa			
Haalli bellama itti deddebite qoricha fudhattu siif taheeraa			
Ogeessi fayya icitii koo naaf eegaa jette ni amantaa			
Yeroo baay'ee bellamaa kee hin eegduu			
Dhiyeessi qorichafarra HIV walqabatee tasumaa rakkon sii hin muudannee			
Waluma galatti tajajila dhabbanni fayya kennutti quuftee jirta			

**kutaa 6: wantoota araada nama qabsiisani fi qarichah ina jajamnee ilaalchisee gaaffiwwani**

- 1 dhugaatii alkoolii dhugdee beektaa?                      1= eeyyee2= lakkii
- Eeyyee tanaan, ji'aa darbee kana dhugdee jirta?      1= eeyyee2= lakkii
- 2 tamboo arsitee/xuuxxe beektaa?    1= eeyyee2= lakkii
- Eeyyee tanaan, ji'aa darbee kana arsitee/xuuxxe jirta?                      1= eeyyee2= lakkii
- 3 jimaa qamaate beektaa?    1= eeyyee    2= lakkii
- Eeyyee tanaan, ji'aadarbee kana qamatee jirta?                      1=eeyyee2= lakkii
- 4 Qorichaa ogeessan siif hin ajajamin fudhatte beektaa?                      1=eeyyee                      2= lakkii
- 5 Qoricha kannen eessaa argatta? 1=dhabbilee fayya motumma 2=mana qoricha dhunfaa 3= iddoo biraa\_\_\_\_\_
- 6 Qorichaa seeraan alaa/kontrobaandiin galuu naanno kanatti nia rgamaa? 1= eeyyee2= lakkii
- 7 Qoricha kontrobaandiin galuu fudhachuun qorichaa farra HIV kana haala fudhatamu qabuun fudhachuu irratti dhiibba qabaa?1- eeyyee 2- lakkii
- “ulfaadha!! Hora!! Deebanaa!!”-----

**Annex IV Interview Gide for pharmacists and other HCP**

Name of interviewer\_\_\_\_\_

place of interview\_\_\_\_\_

Date of interview \_\_\_\_\_

HCP interviewed profession \_\_\_\_\_

Role in ART program \_\_\_\_\_

Time since he/she involved \_\_\_\_\_

I would like to appreciate your willingness to participate in the study. The purpose of the study will be to assess the level of adherence to antiretroviral therapy and its determinant factors among HIV infected adult patients.

1. Adherence to ART drug is major challenge in PLWHA as a country and world-wide, do you think that adherence is an issue in your area?
2. What is/are major factors for non-adherence especially in this area from your experience?
- 2 What do you think about illegal /contraband drugs existence in this area?
- 3 Are there ART drug available through black market/ illegal /contraband drugs?
- 4 Do you think that illegal /contraband drugs existence influence adherence to ART drugs?
- 5 What are strategies being in place to monitor adherence?
- 6 What are strategies being in place to support adherence?
- 7 What are the main challenges you think to support your patients to adhere to ART?

## **Annex V Information capturing sheet**

### **Clinical characteristics**

1-Time in years since diagnosis with HIV infection \_\_\_\_\_

2- Clinical stage at the time of ART initiation \_\_\_\_\_

3- The baseline CD4 count at the time of ART initiation \_\_\_\_\_

4- The latest CD4 count after at least 6 months of treatment \_\_\_\_\_

5- Time since ART initiation in years \_\_\_\_\_

**Medication related**

1. The type of regimen and frequency

Regimen	Morning (no. of pill)	Evening (no. of pill)

2. Other medication if any(regimen)

Drug	Indicated for	Dose	Duration

Is ART medications changed since ART initiation?

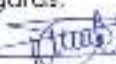
1-Yes

2-No \_\_\_\_\_

**Appointment**

1. Time of appointment in month \_\_\_\_\_

2. collected his/her medication on time 1- Yes 2 No

<p>በ ፋርማሲ ት/ህ/ት የኢትዮጵያ ዕድል ቦርድ</p>	<p>አዲስ አበባ ዩኒቨርሲቲ Addis Ababa University</p> 	<p>School of Pharmacy Ethical Review Board</p>
		<p>ቀን: May 29, 2019          ዕድሜ/ቀን: ERB/SOP/96/04/2019          የቁ. No. _____</p>
<p>To: <b>Tigist Solomon</b> School of Pharmacy</p>		
<p>Re: <b><u>Ethical Clearance</u></b></p>		
<p>It is to be recalled that you submitted a study proposal entitled <b><i>“Assessment of level and factors affecting adherence to Antiretroviral therapy in Nagelle town Oromia Regional State Ethiopia”</i></b> for ethical approval by the School’s Ethical Review Board (ERB). The Board thoroughly reviewed the proposal based on its operational guidelines and found it to fulfill all ethical requirements stipulated in the guidelines. This is, therefore, to inform you that the proposal is ethically approved for implementation.</p>		
<p>With best regards,          Arebu Issa           Chairperson, ERB</p>		
		
<p>☎ 0111156 0217    ☎ 1176</p>	<p>ጽሑፍ    410 Telex: 31205</p>	<p>ጽሑፍ    410 Fax: 0111(11)558506    ጽሑፍ Cable: AALUNIV</p>

Lakk/Ref.No. BEFO/WBATM/116/1721

Gurya/Date 23/9/2011

W/E/T/God/Naam tiif

Hospitala Nagallee tiif

Nagallee

Nagallee

Dhimmi: Kalayya Deggersa Ilaala

Akkuma beekama Biroom Keenya Ogeyyii, dhabbila akkasumas namoota qorannoo gegessuuf propoozala dhiyeffatan propoozala Isaanii madaaluun akkasumas Iddo biratti ilaalchisani fudhatama argatan (approved) dhiyeffatan, propoozala Isaanii ilaaludhaan waraqa deggersa ni kennu. Haaluma kanaan mata duree "Assessment of level and factors affecting adherence to antiretroviral therapy in Nagela Town, Oromia Region, Ethiopia" jedhamu irratti "Tigist Solomon" Magaalaa keessan keessatti hospitaalaa Nagallee fi buufata fayyaa irratti qorannoo gegessuuf propoozala isaanii koree "Health Research Ethical Review Committee" Biroom keenyatti dhiyeffatani jiru. Haaluma kanaan koree "Health Research Ethical Review Committee" Biroom keenyaa propoozala kana ilaaluun mirkanessaa qorannoon kun akka hojii irra adu murteessaa jira. Kanaafuu, hojii qorannoo kana irratti deggersa barbaachisa ta'a gootaniifi, hordoftan jochaa.

"Tigist Solomon" qorannoon kun qaaceffamee eerga xumuramaa booda firi isaa koppii tokko BEFO tiif akka galii godhan galagalcha xalayaa kanaan isaan beeksifna.

Anis, "Tigist Solomon" wayitti qorannoon kun qaaceffame xumuramu firi isaa koppii tokko BEFO tiif galii gochuuf mallattoo kactin mirkanessa.

Mallattoo \_\_\_\_\_

Meqaa "Tigist Solomon"

Bilbila \_\_\_\_\_

G/G

"Tigist Solomon" tiif

Finfinnee

W/Bul/Mag/Nagallee tiif

W/Sul/God/Guji tiif

Nagallee



Nagaa wajji

*Handwritten signature*

*Handwritten signature*



Lakk AEF/359/85/80  
Guyyaa 26/10/2011

**Waajjira Eegumsa Fayyaa Bul/Magaalaa Nageelleetiif**

**Hospitaala woliigala Nageelleetiif**

**Nageelle**

**Dhimmi : Deeggarsaa akka gootan gaafachuu ta'a**

Akkuma armaan olitti ibsanuuf yanlaameetti A/de Tigris Solomon piroopoznala qorannoo mata duree "Assessment of level and factors affecting adherence to antiretroviral therapy in Nagele Town, Oromia Region, Ethiopia" Hospitaala Nageellee fi Bmfata fayyaa Nageelleetiif akka hojjataniif Biroo Eegumsa Fayyaa Oromiyaa xulayaa deeggarsa akka godhamauf nu beeksisani jiru.

Isinis kanuma bu'ura hojjatuu tanaaf deeggarsaa barbaachiisu hundaa akka gootaniif isin beeksisna.

G.G

⊕ A/dee Tigris Solomonniitiif

B/I



Nagaa wajjin

*[Handwritten signature]*  
Garaachan Bulchitaa Oromiya  
Taliqa Bulchitaa Oromiya  
Bulchitaa Oromiya  
Garaachan Bulchitaa Oromiya  
Taliqa Bulchitaa Oromiya

