# Adherence to Antiretroviral Treatment Among Adult HIV Patients in Addis Ababa, Ethiopia: A Facility-Based Cross-Sectional Study

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## Abstract

Adherence to Antiretroviral Treatment (ART) has paramount significance to reduce HIV replication, warding off viral resistance, and decrease HIV – related morbidity and mortality. HIV patients have been challenged to attain the optimal level of adherence to ART owing to a variety of social, psychological, spiritual, and medical reasons. To examine factors associated with adherence among HIV patients taking antiretroviral treatment at five government hospitals in Addis Ababa, Ethiopia. A survey was conducted in ART clinics of five randomly selected hospitals in Addis Ababa from January 21, 2018 to February 25, 2018. Data collected using six standardized scales were entered and analyzed using SPSS version 20. Descriptive statistics was used to summarize socio-demographic information, estimate the prevalence of alcohol use, depression, and adherence to antiretroviral treatment. ANOVA and t tests were used to examine mean differences, and multiple regression was used to identify the contribution of the independent variables on the dependent variables at 95% confidence Interval and a statistical significance $p < .001$. Adult HIV patients consisting of 64% were fully adhered to ART, 52% reported current use of alcohol, and 55.6% reported having some degree of depressive symptoms. Alcohol use ($\beta = -.059$), depressive symptoms ($\beta = -.022$) and HIV disclosure stigma ($\beta = -.034$) were associated with adherence. In conclusion, ART adherence was significantly associated with alcohol use, depressive symptoms and HIV disclosure stigma. Addressing psychosocial factors related to ART adherence would help Adult HIV patients to improve their level of adherence.

*Key words*: HIV, Adherence, Antiretroviral, Psychosocial factors, Addis Ababa

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Ethiopia introduced antiretroviral treatment (ART) in 2003 and launched a free ART scheme in 2005.Adherence is extremely important for the success of antiretroviral treatment. Yet, different prevalence of adherence ranging from 65 to 90.8 have been reported (Bikila et al.2015; Dibaba & Hussein, 2017) which indicates non-adherence of 9.2%to 35%. Higher rates of adherence decrease morbidity and mortality whereas low adherence gives chance to the virus to replicate itself and become resistant to treatment (Johnson et al., 2007) and decrease in quality of life (Chesney et al., 2007). Thus, commitment to compliance with the recommended therapeutic instruction is compulsory (Kenreigh & Wagner, 2005) and requires systematic use of 90-95% of the recommended ART (Drachler et al., 2016). Empirical evidences have demonstrated several factors affecting adherence to ART (Heestermans et al.,2016) particularly, lack of social support, ill-health emotional experiences, knowledge gap and belief about HIV treatment, drug or alcohol abuse (Carrieri et al., 2006; Dietz, 2010).

Several studies have revealed that as compared to the general population, prevalence of substance abuse and associated health risks is high among adult HIV patients (Galvan et al., 2002; Ibrahim & Sale, 2014; Nduka et al., 2015; Patel & Parikh, 2016). They take substances to combat the psychosocial challenges and thereby experience mental tranquility. Alcohol is one of the substances that decrease the level of ART adherence (Jaquet et al., 2010). Tt influences the proper utilization of antiretroviral therapy (Pandrea et al.,2010) by interfering with the memory processes necessary to take treatment and maintain adequate adherence (Parson & Rosof, 2008). HIV patients who intake alcohol fail to use ART provisions as prescribed or skip the medication owing to the influence of alcohol. Similarly, depression and anxiety are commonly observed

emotional problems (Dessalegn et al., 2015; Getachew et al., 2016; Mahir et al.,2015) that result in failure to take medication (Abas et al., 2014). Likewise, HIV/AIDS is stigmatized disease; as a result, discrimination is another challenge that these people face (FDRE MoH, 2014).

Discrimination may cause isolation, low self-esteem, decrease motivation to take treatment, and consequently results in poor ART adherence (Elliott et al., 2009; Sowell & Phillips, 2010). Also, felt, and enacted stigma, in the form of backbiting and gossip have an adverse effect on the life of this group of the society (Blessed & Ogbalu, 2013). Receiving inadequate social support from family members has an adverse effect on treatment adherence as well (Amsalu et al., 2014). Therefore, HIV patients are often perceived negatively and discriminated against, they suffer from emotional problems and to combat the agony of discrimination, emotional distress they may resort to substance abuse. All these circumstances may affect them to abide to treatment regulation. Poor adherence to treatment mainly affects HIV patients and indirectly the economy and health care system of the country. Thus, do the psychosocial factors and demographic characteristics affect adherence to antiretroviral treatment among Adult HIV patients?

**Objective**

In this study the objective was to find out the effect of psychosocial factors and demographic characteristics on adherence to antiretroviral treatment among Adult HIV patients.

## Methods and Materials

**Study site and period**

The study was conducted in Addis Ababa, Ethiopia, from January 21, 2018 to February 25, 2018. Addis Ababa has different levels of public and private owned hospitals of which 13 are

government run and 19 privately owned during the study period. Both state run and private hospitals provided HIV care and support for a total of 43,542 ART users during data collection for this study. The number might have increased afterwards. Among these total antiretroviral treatment users, 78% (34, 032) had received the service from government hospitals and the remaining 22% (9,510) from private hospitals. As compared to the privately run hospitals all government owned served many cases.  Out of 13 hospitals, five government hospitals were randomly selected.

**Design**

The design of the study included Facility - based (hospital - based) cross - sectional survey.

**Participants**

The study included HIV patients aged 18 years and above that started antiretroviral treatment having regular follow up in the hospitals during the study period. The size of the sample was determined by the following factors: the estimated prevalence of the variable of interest, the desired level of confidence, the acceptable margin of error, a 5% non-response rate because adult HIV patients may be unwilling to respond to questions about their behavior in relation to antiretroviral treatment adherence, and a 5% incomplete response rate.

The overall active antiretroviral treatment users in the five specified hospitals were 9,428. In each hospital there were respectively 1805, 2120, 2318, 2712, and 473.The computed proportion to select samples from each hospital out of the total population (9428) was 4.5%. Thus, the total sample obtained was 424; and the proportion from Ras Desta Damtew, Federal Police, Yekatit 12, Dagmawi Minilik, and Tirunesh - Beijing Hospitals were 81, 96, 104, 122 and 21respectively. The sample for the study was generated at random using a computer

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program. Nominated respondents were contacted for data collection during their clinical appointment (follow up) and by contacting them through telephone and arrangement of an appointment (date and time) with them.

**Data collection methods**

Six standardized scales /questionnaires were used in this study

*Morisky Medication Adherence Scale (MMAS – 8) (Morisky, 2008) was used* to assess adherence to antiretroviral treatment consisting of 8 items. Items from 1 to 7 are dichotomous based on a "Yes" or "No" response.The last item (item 8) has a 5-point Likert response choice. Original Cronbach alpha or internal consistency reliability of the MMAS was 0.93 and for this study the Cronbach alpha was found to be 0.71.

*The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988)* of 12 items with a 7-point Likert scale ranging from very strongly agree (7) to very strongly disagree (1). It has three sub-scales viz., Family (FA), Friends (FR) and a Significant Other (SO) and each subscale has four items. The scores from each of the three subscales yield the perceived social support from each source and overall degree of social support . Higher scores indicate greater perceived social support. Original Cronbach alpha of the MSPSS was 0.93 and in this study, it was found to be 0.91.

*The Depression, Anxiety, Stress Scale (DASS – 42) (Lovibond & Lovibond, 1995)* consists of three self-report scales for the emotional states: depression, anxiety, and stress. Each scale contains 14 items with a 4-point Likert scale ranging from 0 (didn't apply to me at all) to 3 (applied to me very much). Original Cronbach alpha  for the Depression, Anxiety, and Stress were 0.91, 0.84, and 0.90 respectively. In this study reliability for depression was 0.99, for Anxiety 0.98 and

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for Stress 0.98. Similarly, the anxiety sub-scale was used as a scale and entered into the regression model.

***The Berger HIV Stigma Scale (BHSS) (Berger, 1999)*** is a 40 - item self-rated questionnaire under four dimensions (10 items in each subscale) of HIV stigma: (i) Personalized stigma, (ii) Disclosure, (iii) Negative self-image, and (iv) Public Attitude stigma. Items were on 4-point Likert scale (strongly disagree = 1 to strongly agree = 4). In this study, only the HIV disclosure stigma sub-scale was used. The HIV disclosure stigma original internal consistency reliability was 0.90 and, 0.83 in this study.

***Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST V.3.0) (WHO, 2010)***. It is a questionnaire with 8 items relating to psychoactive substances. The score for each substance indicated falls under 'low' (0-3 for all other substances and 0-10 for alcohol), 'moderate' (4-26 for all other substances and 11-26 for alcohol), or 'high risk' category (27+ for all substances including alcohol). Each item is followed by choices for the respondent to select from and, for items 2 to 7 the choices have been assigned numerical scores and are added up for each substance to derive an ASSIST risk score for each one of the substances. The only substance studied in this study was alcohol.  The alcohol original reliability was 0.76 and 0.95 in this study.

***The HIV Treatment Adherence Self-efficacy (HIV-ASES-2007) (Johnson et al., 2007)*** scale consists of twelve items in an 11-point Likert type response format with possible range of scores from 0 ("cannot do at all") to 10 ("completely certain can do"). The scale defines high and low scores as above and below the median of the 11 summed possible score (0–10). In this study, HIV-ASES was used as a scale. The scores of the 12 items were added and the total score is

entered into the regression model. The internal consistency was >.90. The reliability of the scale in this study was 0.86.

Finally, data on the socio-demographic details of the respondents were collected with survey questions developed by the researcher.

**Data quality assurance**

To make sure that the collected data are usable, the scales were pretested. Besides, the data collectors were recruited based on their qualification and work experience. Whereas eight of them were graduates in clinical nursing (with BSc), two were Public Health graduates. Further, training was offered for the 10 data collectors (Female = 8 and male = 2).

**Data Analysis**

Data screening, cleaning, and analysis were made prior to conducting data analysis. The assumptions of normality, linearity, homogeneity of variance and multicollinearity were checked. Descriptive statistics was used to summarize respondents' socio-demographic characteristics and to determine the prevalence of alcohol use, depression, and adherence to antiretroviral treatment. Pearson's correlation was computed to examine the relationship between adherence and psychosocial factors: depression, anxiety, self-efficacy, perceived lack of social support from family and friends, HIV disclosure stigma, alcohol use. Multiple regression analysis was taken to examine the contributions of the predictor variables on the outcome variable (adherence to ART). The significance of the statistical tests was set at 0.05 level.

**Ethical approval**

The study was approved by the Research Ethics Committee of the School of Psychology, Addis Ababa University. Medical directors and their subordinate health officials were contacted and permission obtained. The study participants were given the necessary information about the study's purpose and that participation was entirely voluntary; refusal to participate would not affect the medical care they received, personal identifiers would not be used to ensure participants' anonymity, keeping confidentiality of information gathered was assured, and that the study would not cause any harm to them. Finally, data were collected from participants after they gave verbal consent to data collectors.

## Results

### Socio-demographic characteristics of the study participants and descriptive summary of the study variables

A total of 424 subjects participated in the study but 406 completed and returned the questionnaire (96% response rate). Of these participants 54% (n=219) were males and 46% (n=187) females. The age range of the participants were 18-72 years (mean=42.9 years, SD=9.9) and those with the age group 40-60 years were 52.0% (n=211). A majority participants (83%,=337) have attended formal education (primary education – University degree). Concerning marital status, 50.2% (n=204) were married and the rest unmarried (17.20%, n=70), divorced (13.80%, n=56), and widower (18.80%, n=76). Most of the participants (84.2%, n=342) were Orthodox Christian and the rest Muslim (4.40%, n=18), Catholic Christian (2%, n=8), and Protestant (9.40%, n=38).

The descriptive information of the study variables showed that 52% (n=211) of the participants were current alcohol users. About psychological problems, 44.3% (n=180) of the

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respondents had low risk level of depression followed by mild (25.1%, n=102) and moderate

(30%, n=124) risk level, respectively. Regarding levels of anxiety, a little over to one-third of

the respondents (39.2%, n=159) were under normal range, and the rest with mild anxiety

(14.5%, n=59), moderate anxiety (26.40%, n=107), severe anxiety (12.10%, n=49) and very

severe anxiety (7.9%, n=32). Concerning participant's level of adherence to antiretroviral

treatment, 3.7% (n=15) had high level of adherence, 60.3% (n=245) had moderate level of

adherence, and 36% (n=146) had lower level of adherence. Taking together the moderate and

high level of adherence only 64% (n=260) had the standard level of adherence. Regarding social

support, participants had received moderate level of social support from their families [78.3%,

n=318] and from their friends [76.4%, n=310].

**Table 1**

*Socio-demographic characteristics of participants (N=406) and Descriptive summary of the study*

*variables*

| Variable | n | % |
|---|---|---|
| Sex | | |
| Male | 219 | 53.9 |
| Female | 187 | 46.10 |
| Age in years | | |
| 18– 40 | 175 | 43.1 |
| 41 – 60 | 211 | 52.0 |
| >60 | 20 | 4.9 |
| Religion | | |
| Orthodox Christian | 342 | 84.2 |
| Muslim | 18 | 4.40 |
| Catholic | 8 | 2.00 |
| Protestant | 38 | 9.40 |
| Marital status | | |
| Single | 70 | 17.20 |
| Married | 204 | 50.20 |
| Divorced | 56 | 13.80 |
| Widowed | 76 | 18.80 |
| Level of  education | | |
| Can't read and write | 34 | 8.40 |
| Able to read and write | 35 | 8.60 |

| | | |
|---|---|---|
| Primary  complete | 99 | 24.40 |
| Secondary.  complete | 144 | 35.50 |
| Diploma | 64 | 15.80 |
| First degree and above | 30 | 7.40 |
| Current alcohol use | | |
| Yes | 211 | 52.0 |
| No | 195 | 48.0 |
| Depression | | |
| Normal (0-9) | 180 | 44.30 |
| Mild (10-13) | 102 | 25.10 |
| Moderate (14-20) | 124 | 30.50 |
| Anxiety | | |
| Normal (0-7) | 159 | 39.20 |
| Mild (8-9) | 59 | 14.50 |
| Moderate (10-14) | 107 | 26.40 |
| Severe (15-19) | 49 | 12.10 |
| V. Severe (20+) | 32 | 7.90 |
| ART level of adherence | | |
| < 6 (low adherence) | 146 | 36.00 |
| 6 - <8 (Medium adh.) | 245 | 60.30 |
| 8 (High adherence) | 15 | 3.70 |
| Level of social support from family | | |
| 1 – 2.9 (Low support) | 49 | 12.1 |
| 3 - 5 (Moderate support) | 318 | 78.3 |
| 5.1 – 7 (High support) | 39 | 9.6 |
| Level of social support from friends | | |
| 1 – 2.9 (Low support) | 65 | 16 |
| 3 – 5 (Moderate support) | 310 | 76.4 |
| 5.1 – 7 (High support) | 31 | 7.6 |

**The association of demographic and psychosocial factors and adherence to antiretroviral treatment**

The regression model with demographic variables (sex, age, marital status, level of education, religion, duration of ART treatment in years) and psychosocial factors (alcohol, depression, anxiety, self-efficacy, family support, friends support, HIV disclosure stigma) as independent variables and adherence to antiretroviral medication as outcome variable explained 30% of the total variance ($R^2=.300$, $F (21,384) =7.85$, $P<0.01$). Among the psychosocial factors, alcohol ($\beta = -.059$), depression ($\beta = -.022$), and HIV disclosure stigma($\beta = -.034$)were statistically associated with adherence. The associations are negative. This implies that for every unit change in alcohol consumption there is 0.059 point decrease in adherence, for every unit

increase in depression there was 0.022 point decrease in adherence, and for every unit increase in HIV disclosure stigma there was 0.034 point decrease in adherence. As shown in table 2 In this multiple regression analysis, the demographic factors were not statistically associated with adherence.

**Table 2**

*The association of demographic and psychosocial factors and adherence to antiretroviral treatment*

| Factors | Coef. | Std. Err. | t | P | 95% conf. Interval |
|---|---|---|---|---|---|
| Sex | | | | | |
|   Male | 1 | (base) | | | |
|   Female | -.103 | .190 | -0.54 | 0.588 | -.477– 0.271 |
| Age | -.002 | .009 | -0.26 | 0.797 | -.021– 0.016 |
| Education | | | | | |
|   Cannot read and write | 1 | (base) | | | |
|   Able to read and write | -.509 | .378 | -1.31 | 0.190 | -1.271 – 0.254 |
|   Primary educ. Complete | -.614 | .324 | -1.89 | 0.059 | -1.252 – 0.023 |
|   Secondary educ. Complete | -.767 | .313 | -2.45 | 0.051 | -1.383 – -0.152 |
|   Diploma holder | -.682 | .351 | -1.94 | 0.053 | -1.372 – 0.004 |
|   First degree and above | -.672 | .416 | -1.62 | 0.107 | -1.489 – 0.145 |
| Religion | | | | | |
|   Orthodox | 1 | (base) | | | |
|   Muslim | -.284 | .398 | -0.71 | 0.475 | -1.067 – 0.498 |
|   Catholic | .332 | .582 | 0.57 | 0.568 | -.812 – 1.477 |
|   Protestant | -.423 | .282 | -1.50 | 0.135 | -.978 – 0.132 |
| Marriage | | | | | |
|   Single | 1 | (base) | | | |
|   Married | .042 | .229 | 0.18 | 0.855 | -.409 – 0.493 |
|   Divorced | -.204 | .303 | -.067 | 0.501 | -.799 – 0.392 |
|   Widowed | -.292 | .296 | -0.98 | 0.325 | -.875 – 0.291 |

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| | | | | | |
|---|---|---|---|---|---|
| Duration of ART treatment in Years | -.012 | .020 | -0.61 | 0.544 | -.053 – 0.028 |
| Alcohol | -.059 | .007 | -8.41 | 0.000 | -.073 – -.045 |
| Self-efficacy | -.008 | .005 | -1.68 | 0.093 | -.018 – .001 |
| Depression | -.022 | .005 | -4.04 | 0.000 | -.032 – -.001 |
| Anxiety | -.014 | .008 | -1.78 | 0.076 | -.030 – .001 |
| Family support | -.000 | .015 | -0.03 | 0.976 | -.030 – .029 |
| Friends support | .008 | .014 | 0.60 | 0.549 | -.019 – .036 |
| HIV disclosure stigma | -.034 | .009 | -3.45 | 0.001 | -.053 – -.015 |

$R^2 = 0.30$

Adj. $R^2 = 0.26$

F= 7.85[***]

*** = p< .001

## Discussion

Adherence to antiretroviral treatment among adult HIV patients was 64%. This finding

is somewhat similar with previous findings in Ethiopia (Dibaba & Hussein, 2017; Lemma &

Wubshet, 2017). It is also comparable to the results of studies conducted in Cameroon (65.1%)

(Pefura-Yone et al., 2013]. Expected adherence is 95% and above but the current study showed

lower prevalence. One possible explanation may relate to personal factors, mainly, belief about

one's health condition. As Bandura state (Bandura, 1986)  ART users may intentionally avoid

treatment as a result of their personal beliefs attached to the disease that taking ART is futile for

an illness that cannot get cured and then resort to other treatment options, probably to the

traditional approaches (Glanz et al., 2002) underlined that patient's beliefs about perceived

health condition influences compliance with adherence and effectiveness of treatment. Still,

ART users may shun treatment due to the influence of external pressures, particularly, fear of

social rejection, fear of HIV disclosure and stigma.

The second possible explanation may relate to the social and cultural values of the society attached to the disease. HIV is considered as a disease created to punish people who are not abiding by the rules of God and HIV infected persons are presumed to be sinful people who acquired the disease as a result of their sexual transgressions. This sort of undesirable social evaluation may create dismay and emotional instabilities and may cause alcohol abuse as a coping mechanism to overcome the agony of psychological pain experienced. The emotional disturbances along with alcohol abuse may at last result in poor compliance with treatment inadvertently; alcohol abuse is a major obstacle in the fight against HIV/AIDS (Galvan et al., 2002). Unfortunately, alcohol has a negative outcome to the treatment of AIDS.

The present study revealed that three variables accounted for a significant portion of the variance in the criterion variable both independently and jointly. Psychosocial factors such as alcohol-use, depression and HIV disclosure stigma significantly predict adherence; in combination explained significant variation in ART adherence. Taken together, the three variables accounted for 30% of the variance in the dependent variable – adherence to treatment.

Alcohol use was negatively and significantly associated with ART adherence. This finding goes with a study finding in Botswana (Do et al., 2010) indicating that alcohol use is a formidable barrier to ART adherence.  Researchers have demonstrated the impact of alcohol use and treatment adherence (Galvan et al., 2002; Lucas et al., 2002). Many other studies have also established the association between alcohol use and non-adherence to antiretroviral treatment (Chesney et al., 2000; Jaquet et al.,2010; Nakimuli-Mpungu et al., 2012; Pefura-Yone et al.,2013). Similarly, studies in Ethiopia have shown that antiretroviral treatment to be low among HIV patients who use alcohol (Bikila et al., 2015; Dibaba & Hussein, 2017; Lemma et al., 2017). The adverse effect of alcohol on ART adherence was also explained by some scholars. According to

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Parson and Rosof (2008) when people get drunk, their judgment gets impaired, the capacity to make decisions become poor and they are likely to forget treatment.  Similarly, a study by Braithwaite and Bryant (Braithwait & Bryant, 2010) showed that alcohol consumption reduces compliance with ART adherence.

The current study found that depression was negatively and significantly associated with adherence to ART. This shows that as depressive symptoms get worse among adult HIV patients their probability of not adhering to treatment gets higher. The association between depression and treatment non- adherence was reported in several studies (Bikila et al., 2016; Abas et al., 2014; Berhe et al., 2017).

Theoretically, when the feelings of depression are pervasive, it negatively affects a person's daily life functioning. The incurable nature of the disease may induce the symptoms of depression which resulted in poor initiatives to do an activity, loss of interest in life, and failure to take antiretroviral treatments.  Depression is common among HIV positive people after they received a diagnosis of the disease and later during treatment. Empirical evidence also indicates the connection between depression and poor adherence. Poor adherence, in turn, causes less motivation and productivity.

The current study's findings are consistent with numerous studies and support some theoretical perspectives. For instance, Cognitive Theory of Depression developed by Beck (Beck et al., 1979) explained that depressed individuals tend to view themselves as worthless, see the future as hopeless, and interpret events in a defeatist way where these cognitive thinking led them to impairments in perception, memory and problem solving. Similarly, the Learned Helplessness Theory of Depression stated that depression occurs when people believe that important life events are beyond their control and that they are to blame for their helplessness.

Moreover, a study by Panchmatia et al. (2016) pointed out that the incidence of depression becomes high when stress, social isolation, intense demoralization, HIV related medical conditions and burden of medications overwhelm the life of HIV infected people.

HIV disclosure stigma was the other social variable that negatively predicted adherence. This means that as fear of disclosing HIV status continues among adult HIV patients their chance of adhering to treatment decreases. The result indicates that fear of disclosure and the resulting stigma was a problem for participants of the study. In other words, they were extremely fearful of disclosing their HIV status to others in order to avoid social stigma.

Concealing one's HIV infection from partners or families may not be surprising for people living in traditional societies such as in Ethiopia where HIV/AIDS is perceived as contagious and where victims of the disease are labeled as promiscuous and deviant and where those who acquired the disease are disrespected and stigmatized. Some people still held misconceptions about HIV/AIDS and the way it is transmitted. They do admit that sexual intercourse is the only mode of the transmission. Generally, majority of HIV victims do not want to disclose their status to someone else. They feel embarrassed and do not want to be noticed by others. They shield themselves to avoid stigma and discrimination. Therefore, compliance with ART becomes infrequent among this group of the population as taking medication in the presence of others may involve adverse consequences in their lives. In this regard, Elliott et al. (2009) revealed that HIV/AIDS stigma and discrimination are harmful, affecting socialization and ultimately leading to treatment failure. Similarly, research has shown that HIV disclosure stigma is a negative predictor of ART adherence.

**Conclusions**

According to the study, only 64% of adult HIV patients fully adhered to ART. Alcohol use, depression, and HIV disclosure stigma were found to have a negative impact on ART adherence. Rate of adherence in males was lower (60%) than their female counterparts (69%). The study suggests that adult HIV victims have psychosocial problems that have influenced their level of adherence. As a result, addressing psychosocial factors such as alcohol use, depression, and stigma would aid adult HIV patients in improving their adherence. From a theoretical standpoint, the findings of this study will contribute to the body of literature on antiretroviral treatment adherence in general, as well as the relationship between psychosocial factors and their impact on antiretroviral treatment adherence. So, the theoretical implication of the study findings indicates that there is an inverse relation between alcohol abuse, depression, and HIV disclosure stigma with adherence. Thus, understanding the association between psychosocial factors and adherence is believed to have theoretical contributions.  Similarly, the findings have functional contributions, that is, teaching adult HIV patients to foster good psychological health, avoid using alcohol, and relegating the stigma attached to their HIV would help them to increase the proper usage of the antiretroviral treatment.

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