

# Adherence to Anti-Retroviral Therapy and Its Determinants in HIV/AIDS Patients

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**Abstract:** *Although Highly Active Anti-Retroviral Therapy (HAART) significantly reduced HIV/AIDS mortality, appropriate adherence level is recommended for viral suppression and therapeutic response in People Living with HIV/AIDS (PLWHA). In the most studies, adherence is defined as taking 95% of prescribed medications. Poor or non-adherence may lead to treatment failure and drug resistance. There is no golden standard for evaluation of adherence to medication and many measurement methods are used to assess adherence rate. Moreover, several determinants have been contemplated for adherence in different studies; however, the exact roles of some determinants are not well established. The goals of this review are to describe the adherence rates, to discuss the advantages and disadvantages of common adherence measurement methods, to examine significant correlations related to adherence and to recommend strategies for improving adherence in clinical care.*

**Keywords:** HIV/AIDS, anti-retroviral therapy, adherence, measurements, correlations

## 1. Introduction

Stimulant use is associated with increased rates of HIV transmission risk behavior, acquisition of strains of HIV that are resistant to some classes of antiretroviral medications, impaired adherence to anti-retroviral therapy (ART), and elevated HIV viral load (Carrico et al. 2007; Colfax et al. 2007; Gorbach et al. 2008; Hinkin et al. 2007; Johnson et al. 2008; Morin et al. 2007). Consequently, stimulant users have been identified as an important group to target for HIV prevention efforts. There is some preliminary evidence that behavioral interventions designed to enhance motivation as well as bolster self-efficacy for reducing sexual risk taking are effective in decreasing HIV transmission risk behavior in methamphetamine users (Mausbach et al. 2007). However, little is known about the role of potentially modifiable psychological factors (like affective states) in relation to substance use and ART adherence among HIV-positive stimulant users. In a prior cross-sectional investigation, we observed that enhanced affect regulation was indirectly associated with lower HIV viral load via two independent behavioral pathways, a decreased likelihood of reporting regular stimulant use and better self-reported ART adherence (Carrico et al. 2007). Although these findings are informative, further investigations are needed to examine specific affective correlates of these important health behaviors in HIV-positive stimulant users.

## 2. Materials and Methods

### 2.1 The study and setting

This cross-sectional study was conducted on patients with HIV/AIDS, who were over 18 years of age. These patients referred to the behavioral diseases counselling center of Iran in 2018.

### 2.2 Sampling

The inclusion criteria for the study participants were having 18 years or more and using ART for 6 months. Since the statistical population included 183 individuals, census sampling method was conducted. Considering that 122

people participated in the study, the response rate was calculated as 66.67%.

### 2.3 Data collection

The AIDS Clinical Trial Group (ACTG) questionnaire, designed by Kekwaletswe for HIV positive patients, was applied in this study. The questionnaire consists of six parts. The first part relates to the ART adherence and includes two questions: (1) loss of ART within a week and (2) loss of ART within the past month (How many pills have you lost in a month or a week?). The adherence rate was calculated by multiplying the number of pills consumed per week or month by 100 divided by the total received tablets. The cutoff point of adherence was considered at 95%. In this study, the mean adherence of seven and 30 days were considered as the ART adherence. The second part of the questionnaire deals with the causes of ART non-adherence and includes 18 items (never = 0, rarely = 1, sometimes = 2, and often = 3). The third part of ACTG investigates 20 common symptoms experienced by patients during the past month (never = 0, rarely = 1, sometimes = 2, and often = 3). The fourth part of the questionnaire studies the self-efficacy of adherence and beliefs with regard to the usefulness of drugs. This section contains three items, which should be answered on a 4-point Likert scale (ranging from "I'm not sure at all = 0" to "I am completely sure = 3"). The fifth part considers social support. In this section, participants' satisfaction with family and friends' support was studied in one item (very dissatisfied = 0 to very satisfied = 3). The patients' satisfaction with the family and friends' help in taking ART was also evaluated in one item (not at all = 0 to very much = 4). Part six was about alcohol consumption (in the last 30 days) and drug abuse (in the last 6 months), which should be answered on a seven-point Likert scale (never = zero, once a month = 1, two or three times a month = 2, once or twice a week = 3, three or four times a week = 4, almost every day = 5, and daily = 6). Kekwaletswe et al. confirmed the validity and reliability of this questionnaire by Cronbach's alpha (0.71) [11, 12]. To conduct this study in the Iranian culture and among the people of Kerman, the necessary adjustments were made in the ACTG questionnaire. Its content validity was confirmed by a panel of expert containing 10 physicians and infection

specialists in Kerman University of Medical Sciences. The reliability of the adjusted questionnaire was also calculated as 0.79 by Cronbach alpha.

## 2.4 Statistical analysis

Descriptive statistics were applied to describe the characteristics of the study population, their ART adherence, reasons for non-adherence, symptoms, alcohol consumption, and drug abuse. Univariate and multivariate logistic regressions were run to investigate the predictive factors of the ART adherence. To analyze the data, SPSS version 24 was used.

## 3. Results

A total of 122 PWHIV with an average age of  $41.88 \pm 9.46$  years participated in the study; 53.3% of the participants were male, 46.7% were married, and 36.9% had a diploma or higher educational degrees. The findings showed that 54.1% of patients were unemployed and 41.8% had an income of over US \$ 60. The CD4+ T cell measure was more than 350 in 59% of the participants. The viral load was less than 50 in 63.9% of cases and 41.8% of the patients did not mention any risk factors such as the drug abuse. Furthermore, 57.4% of individuals had no history of methadone use and 34.4% of them had no symptoms during the last month.

The mean ART adherence was  $91.86 \pm 20.81$ ; 24.6% had weak adherence and 75.4% had good adherence. Most patients (74.6%) believed that ART had a positive effect on their health and 59% of them were also confident that lack of ART would increase the resistance of HIV against drugs. In addition, 67.2% of participants were satisfied with the support of other people. In this regard, 71.3% of patients mentioned that their family members and friends supported them to take ART.

Forgetfulness in 26.7% of the cases was the cause of ART non-adherence. Moreover, a high number of ART, lack of knowledge about the medication's worth, and transportation problems (each with 13.3%) were the main reasons for ART non-adherence.

The results of univariate logistic regression showed a significant relationship between the emergence of symptoms in the last 4 weeks and the ART adherence. Furthermore, the odds of poor adherence was 3.63 times higher in participants who had symptoms in the last 4 weeks than the asymptomatic ones ( $P=0.02$ ,  $CI=1.24-10.62$ ) (Table 2). The ART adherence did not have any relationship with other variables.

## 4. Effective strategies for increase of adherence

Since adherence is one of the most substantial determinants of ART success, more serious and broader efforts are needed for keeping the high level of adherence to treatment. The first months of ART are critically important in maintaining the high level of adherence [1, 78-80]. Some of the effec

Adherence to Anti-Retroviral Therapy and Its Determinants in HIV/AIDS Patients Infectious Disorders – Drug Targets, 2012, Vol. 12, No. 5 353 tive strategies for improving the adherence to treatment include:

- 1) To achieve maximum therapeutic effects, patients should be motivated to take anti-retroviral drugs based on physician's orders. Motivating patients via effective communication skills could be helpful in maintaining high level of adherence [3].
- 2) Efforts should be made for providing more social services in line with depression treatment for PLWHA through comprehensive teamwork. Despite the fact that depression is common among PLWHA, it is mostly misdiagnosed. Findings regarding the role of depression in accelerating HIV disease progression are contradictory, but it seems that it is one of the indicators of shorter lifespan among HIV-positive men. This effect on lifespan seems to be independent from immunological and clinical factors associated with disease progression and may work through mechanisms such as reduction of the adherence to treatment [3].
- 3) There is an urgent need to create new drug-delivery system including skin patch for ART [78].
- 4) Decreasing the number of daily pills and doses can improve the rate of adherence [12]. Efforts are made continuously for simplifying the medications such as once a day dose regimen. As a result physicians are looking for antiretroviral regimens to which patients show more adherence [54].
- 5) Being prepared for continuing on ART, belief to treatment as a right way of life and willing to have a longer and healthier life, having continuous and satisfactory relation with the doctor, being compatible with drugs' side effects and improvement of the number of CD4 cells would augment the motivation for 100 % adherence [81].
- 6) Providing the medications through mail order and also distributors in drug organizations might be effective for increasing the adherence [60].
- 7) Educational counseling and follow ups via telephone calls can improve the adherence [21].
- 8) As an effective strategy, the feasibility of once daily HAART regimens has bolded the use of directly observed therapy (DOT) more than before [82-84]. Most often, DOT programs have been widely used among special populations such as IDUs, participants under methadone maintenance programs, homeless patients, prisoners, or PLWHA with low adherence [85, 86]. DOT helps to monitor taking prescribed doses (usually one dose a day, five days a week) in such patients and subsequently increases the adherence [85-87]. Additionally, Fischl et al. showed that being under DOT had significant association with better virological responses [88]. Nevertheless, there have been many important questions around DOT usage (e.g. patient's autonomy versus DOT administration, DOT candidates, duration of DOT management and cost of such programs for PLWHA [88].
- 9) Doctors' overemphasizing on the importance of adherence can conversely obliterate the effect of tasks that were performed for improving the adherence to treatment. Honest and convenient interactions lead to the

favorable adherence and create trust in the therapeutical relation [59].

10) Efforts should be made to overcome obstacles of access, such as the high prices [22]. Current methods for improving the adherence to medications are complicated for chronic diseases and their effectiveness is not predictable [89]. Although many studies have focused on adherence rates and correlations, specific adherence determinants are still arguable. Additionally, adherence-associated complications are individually-based. Thus, patient-based recognition of adherence in addition to close collaboration between HIV researchers and social scientists is recommended to overcome current challenges.

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