

# Adherence to Antiretroviral Therapy and its Determinants among Iranian Older Adults Living with HIV/AIDS

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## ABSTRACT

The human immunodeficiency viruses (HIV) epidemic has been widely known as one of the world's most serious health crises of recent century. Regarding the prolong life expectancy due to the beneficial treatment, The mean age of people with HIV has increased. It's require daily medications in order to control the associated pathology and optimize health. The present study aims to investigate the adherence to treatment and its correlates among older adults living with HIV (OALWH) in Tehran city, Iran. The cross-sectional study was conducted on a convenient sample of 160 patients with HIV/AIDS aged 50 years and older in 2018 who referred to behavioral Counseling Clinics in Tehran. A binary logistic regression using SPSS 20.0 was employed to determine factors associated with treatment adherence. Overall 54.4% of OALWH reported adherence to treatment. The result of adjusted binary logistic regression revealed those living not alone (adjusted odds ratio [aOR], 3.197; 95% confidence interval [CI], 1.182 to 8.649), being economically inactive (aOR, 2.536; 95% CI, 1.024 to 6.480) and those who have positive mood (aOR, 4.669; 95% CI, 1.856 to 11.744) were more likely to have treatment adherence. In the present study the adherence to treatment was low particularly among HIV-infected older adults who are living alone, unemployed and those who have a negative mood. Therefore these vulnerable groups needs to be paid more attention.

**Keywords:** Aged, Cross-Sectional Studies, HIV Infections, Iran, Logistic Models, Treatment Adherence.

## INTRODUCTION

HIV is a major public health concern that affects all the age groups and sex<sup>1</sup>. Previous studies indicated an increase in patients with HIV/AIDS<sup>2</sup>. In 2018, 37 million people in the world had HIV<sup>3</sup>. Due to the lack of policy for preventive or controlling HIV/AIDS infection in some countries, it will affect macroeconomic and gross domestic product (GDP) per capita in country with high rate of patients with HIV.

Considering the beneficial effect of available treatment which reduces morbidity and extends life, the number of people with HIV (PLWH) aged 50 years and over has increased<sup>4</sup>. It means that the use of highly active antiretroviral therapy (HAART) allows individuals to live into old age<sup>5</sup>. Thus, the age of people with HIV/AIDS is increasing dramatically<sup>6,7</sup>. In addition, many older adults are newly diagnosed with HIV and had a late-stage infection<sup>8</sup>.

More than 10% - 17% of the 37 million people with HIV are over 50 years old and this trend is rising steadily<sup>6,9</sup>. HIV prevalence reached its peak between 2007 and 2009 among 80-74 years old patients<sup>10</sup>. In the USA, a country in which the HIV/AIDS is recognized earlier, approximately 50% and 11% of people with HIV were over 50 and 60 years old, respectively<sup>6,8</sup>, and by 2020, about 70% of the people with HIV (PLWH) in the United States will be over 50<sup>10</sup>. Thus, the prevalence of HIV among older adults will become one of the main issues of the health system in countries such as Iran which the age structure transits to aging in the near future.

Studies have demonstrated a high incidence of geriatric syndromes among people with HIV aged 50 and older<sup>11</sup>. These people have difficulties in mobility, self-care, and performing usual activities compared to their HIV-

negative counterparts<sup>7,12</sup>. The elderly with HIV may face other challenges and diseases affecting their quality of life as well as the HIV complications due to the aging process.

A study on older adults with HIV study showed that 77% of older adults living with HIV (OALWH) reported two or more comorbid conditions<sup>7,13</sup>. It seems that PLWH experiences aging earlier due to the long term ART and the personal/lifestyle factors such as physical activity and nutrition as well as socio-economic status which accelerate aging process<sup>14</sup>. Aging with HIV can affect psychological well-being due to stigma and discrimination. Poor mental health and depression can prevent adherence to treatment.

Preventing the consequences of HIV infection depends highly upon treatment adherence<sup>15</sup>. WHO published a handbook (2016) for treating and preventing HIV in which some recommendations were made for adhering to a long term treatment for all groups without considering the number of CD4s. Accordingly, adherence to the treatment can save millions of people dying of AIDS<sup>16</sup>.

Vance et al., (2011) noted That OALWH faces comorbid conditions and problematic HIV treatment adherence. So we need more information about this growing population to facilitate their successful ageing<sup>17</sup>. Adherence to treatment prolongs life expectancy and decreases mortality among PLWH<sup>10</sup>. However, the literature on treatment adherence and aging is limited<sup>18</sup>. The majority of studies on HIV treatment adherence were done on participants less than 50 years old<sup>18,19,20</sup>.

Patients adherence to recommended treatment regimens is affected by sociocultural factors such as gender or education and as well as psychological factors such as positive viewpoint. Refusing to accept the drug regimen

slows down the process of controlling, treatment, recovery, reducing health potential, poor quality of life, drug resistance and increasing infectious diseases along with HIV<sup>21</sup>.

Lack of adherence to treatment and social complications makes this issue important. Evaluating adherence to treatment in HIV patients is essential for health policymakers because failing in treatment increases the virus and consequently results in disease progression. Thus, understanding the complex predictors of lack of adherence to treatment and its effective factors matters<sup>22</sup>. Thus, on one hand, evaluating the determinants of adherence to treatment in the elderly with HIV increases our understanding of the condition of these patients with multiple comorbidities and on the other hand, it helps health policymakers consider predictors of treatment adherence and performs some interventions to improve the quality of life and ageing well of OALWH.

Considering an increase in the number of OALWH and the overlap of old age and HIV problems together, it is critical to explore adherence to treatment and its related factors. The present study aimed to determine factors associated with the adherence to treatment for older adults with HIV in Tehran, Iran.

## METHODS

This cross-sectional study was performed from October to November 2018 in Tehran, Iran. One hundred and sixty patients with HIV aged 50 years and older participated in the study. To select samples, first, the list of behavioral Counseling Clinics affiliated by Tehran medical universities were prepared; and four centers were selected randomly. After getting the permit from the Ministry of Health, we could refer to these centers. Then, data were collected through convenient sampling after getting consent from over-50 years individuals.

**Data gathering instrument:** The data were collected by self-reported questionnaires. The self-reporting method is the most common tool used for antiretroviral therapy among HIV-patients<sup>23-26</sup>. Patients were interviewed with an anonymous questionnaire including three main parts. The first part included questions about socio-demographic characteristics (age, sex, living arrangement, education, employment and Perceived Socioeconomic status (SES)) and HIV-related characteristics (HIV/AIDS stages, drug use, and HIV Disclosure). The second part assessed the patient's positive mood by the positive state of mind (PSOM) scale developed by Horowitz et al (1988). This scale includes individual's ability to achieve positive cognition. PSOM includes six questions to assess focused attention, productivity, responsible caretaking, restful repose, sensuous pleasure, and sharing. The level of experience in PSOM scale is graded according to the 4-point Likert method; (ranged from "Have it well" (score 3) to "Unable to have it" (score 0)). The scoring in this scale is obtained by summing all the items and dividing the result by 6. Thus, the minimum and maximum scores are respectively 0 and 3 on this scale. A score of 3 is defined as have positive mood in the current research. The reliability of scale was 0.91. The third part of questionnaire assessed patients' adherence to treatment. We assessed the adherence with

two simple questions: I take all the prescribed drugs; I take them timely. "Yes" (for both questions) means adherence to treatment and "No" means lack of adherence to treatment.

**Statistical methods:** In the present study, descriptive statistics such as mean, frequencies, and percentages were used to describe preliminary data. Moreover, binary logistic regression was used to estimate the odds ratio (OR) for treatment adherence as a dichotomous dependent variable associated with socio-demographic characteristics and the positive state of mind. The level of statistical significance was  $p < 0.05$ . Data were analyzed using SPSS v.20.0.

## RESULTS

Our results shown that around 66% of the sample were men, and the mean age of respondents was  $65.8 \pm 6.7$  years. Almost 21% of the respondent living alone. Around 44% of OALWH had diploma while close to 13% had only primary education or no education at all. Respondent's employment was 14% and close to 37% were unemployed. Also, half of the respondents had middle socio-economic status. Regarding HIV-related characteristics, 56% of OALWH were with HIV history more than five years. Around 86% disclosure their HIV infection to their family, friends or counselor and 21% of respondents involved with drugs (Table 1).

Further, as Table 1 indicates from 160 OALWH who participated in the study, 54.4% (95% CI: 46.3 to 61.9%) reported adherence to treatment. Using chi-square test we examined the association each of the socio-demographic and HIV-related variables with adherence to treatment. The results show statistically significant relationships with adherence to treatment with predictors includes sex, living alone, education levels, employment status, perceived socioeconomic status, drug addiction, HIV infection time and positive mood (Table 2). In other words, the adherence to antiviral treatment was more common among female (63.6%), individual who were living not alone (59.5%), OALWH with higher education (68%), high SES (69%), respondents who were economically inactive (retired or housewife) (62.8%) and those without drug addiction (58.7%), also respondents with diagnosed history of five years and less (62%) and OALWH who had positive mood (75.9%).

The results of unadjusted and adjusted binary logistic regression are displayed in Table 3. Binary logistic regression was used to estimate the association selected socio-demographic predictors with adherence to treatment. As adjusted binary logistic in Table 3 revealed the likelihood of adherence to treatment is significantly associated with living arrangement (aOR, 3.197; 95% CI, 1.182 to 8.649), employment status (aOR, 2.536; 95% CI, 1.024 to 6.480) and positive mood (aOR, 4.669; 95% CI, 1.856 to 11.744).

Positive mood was the most important factor associated with adherence to treatment. Those categorized as having a positive mood, compared to OALWH with negative mood had 4.7 times higher odds of adherence to treatment. Living alone was another significant factor associated with treatment adherence. Those categorized as living not alone, compared to OALWH living alone had 3.2 times

higher odds of adherence to treatment. Also, those respondents who were not employed or employed, had 2.5 times higher odds of adherence to treatment. categorized aseconomically inactive, compared to

Table 1. The frequency distribution of socio-demographic variables by adherence to HIV treatment among OALWH

Socio-demographic variables		Adherence to HIV treatment		n (%)
		No=73 (45.6%)	Yes=87 (54.4%)	
Sex*	Male	53(50.5)	52(49.5)	105(65.6)
	Female	20(36.4)	35(63.6)	55(34.4)
Age group	50-59	34(4.7)	42(55.3)	76(47.5)
	60-69	16(57.1)	12(42.9)	28(17.5)
	>70	23(41.1)	33(58.9)	56(36.0)
Living alone*	No	51(40.5)	75(59.5)	126(78.8)
	Yes	22(64.7)	12(35.3)	34(21.3)
Education levels*	Illiterate & primary	12(60.0)	8(40.0)	20(12.5)
	Secondary	26(59.1)	18(40.9)	44(27.5)
	Post-secondary & diploma	27(38.0)	44(62.0)	71(44.4)
	Higher education	8(32.0)	17(68.0)	25(15.6)
Activity status*	Unemployed	34(57.6)	25(42.4)	59(36.9)
	Employed	10(43.5)	13(56.5)	23(14.4)
	Economically inactive	29(37.2)	49(62.8)	78(48.8)
Perceived Socioeconomic status*	Low	19(55.9)	15(44.1)	34(21.3)
	Middle	41(48.8)	43(51.2)	84(52.5)
	High	13(31.0)	29(69.0)	42(26.3)
Drug addiction*	No	52(41.3)	74(58.7)	34(21.3)
	Yes	21(61.8)	13(38.2)	126(78.8)
HIV Infection time*	≤5 years	27(38.0)	44(62.0)	71(44.4)
	>5 year	46(51.7)	43(48.3)	89(55.6)
HIV Disclosure	No	11(50.0)	11(50.0)	138(86.3)
	Yes	62(44.9)	76(55.1)	22(13.8)
Positive mood*	No	60(56.6)	46(43.4)	106(66.3)
	Yes	13(24.1)	41(75.9)	54(33.8)

Note: \* p≤0.05

Table 2. Results of Binary logistic regression model for factors associated with adherence to HIV treatment among OALWH

Characteristics		Unadjusted OR			Adjusted OR		
		OR	95% CI		aOR	95% CI	
			Lower	Upper		Lower	Upper
Sex	Male	1			1		
	Female	1.784*	1.147	3.484	0.782	.273	2.240
Age group	50-59	0.861	0.428	1.731	0.447	0.161	1.241
	60-69	0.523	0.209	1.310	0.482	0.166	1.402
	>70	1			1		
Living alone	Yes	1			1		
	No	2.696*	1.226	5.930	3.197*	1.182	8.649
Education levels	Illiterate & primary	1			1		
	Secondary	1.038	0.353	3.051	0.564	0.161	1.970
	Post-secondary & diploma	2.444*	1.031	6.744	1.026	0.308	3.419
	Higher education	3.187*	1.121	10.877	1.561	0.334	7.300
Activity status	Unemployed	1			1		
	Employed	1.768	0.668	4.677	2.223	0.524	6.230
	Economically inactive	2.298*	1.151	4.586	2.536*	1.024	6.480
Perceived Socioeconomic status	Low	1			1		
	Middle	1.328	0.596	2.959	0.613	0.218	1.722
	High	2.826*	1.102	7.244	1.074	0.296	3.901
Drug addiction	No	1			1		
	Yes	.435*	0.200	0.946	0.572	0.199	1.643
HIV Infection time	≤5 years	1			1		
	>5 year	1.743*	1.048	3.288	1.085	0.469	1.512
HIV Disclosure	No	1			1		
	Yes	1.226	0.480	3.133	0.841	0.259	2.727
Positive mood	No	1			1		
	Yes	4,114***	1.977	8.559	4.669**	1.856	11.744

Note: \* p≤0.05, \*\* p≤0.01, \*\*\*p≤0.001

## DISCUSSION

Antiretroviral therapy has significantly decreased the mortality rate caused by HIV and its consequences. Considering the development of treatment and promoting longevity of PLWH, the number of older adults with positive HIV is increasing. OALWH face problems of ageing process such as physical weaknesses together with HIV symptom. thus, age-related factors complicated treatment adherence among older adults. Adherence to treatment is one of the main subjects of HIV studies and recognition of the factors affecting the adherence to treatment is importance. In this paper we investigated the prevalence of adherence to treatment and its determinants among Iranian older adults living with HIV/AIDS.

The results of the present study showed that about 46% of the elderly with HIV did not adhere their treatment. This is similar with the study conducted by Ebrahimzadeh and colleagues showed that medication adherence was higher in older patients<sup>27</sup>. In contrast with our results Peltzer et al (2012) and Yaya et al (2014) reported higher adhered to treatment among the elder people<sup>28,29</sup>. In addition, Ghidei et al (2013) in systematic review research revealed that older age reduced risk for non-adherence by 27%<sup>30</sup>. While in the present study just half of the OALWH adhere to HIV treatment. The study conducted in Africa in 2019, found that 72.15% of older adults were considered adherent. This study revealed higher proportions of older adults were adherent to medication regimens compared with younger adults<sup>31</sup>. The result of binary logistic regression revealed after controlling for individual and demographic variables, the likelihood of adherence to treatment is significantly associated with the living arrangement, employment status, and positive mood. Thus, OALWH who living not alone, economically inactive and respondents with positive mood had higher adherence to treatment.

The results indicated a significant positive relationship between positive mood and adherence to treatment. In consistent to the previous studies, higher levels of PSOM were associated with successful adherence to treatment<sup>32</sup>. Regarding broaden-and-build theory of emotion, high level of PSOM increases attention, thinking and facilitates problem solving. Individual with positive mood have flexible, integrative thought as well as open to information<sup>33</sup>. Creative problem solving may help them adapt to life stressors and manage adherence to treatment.

Also, the importance of living arrangement parallels those of several studies that found an association of social isolation with treatment adherence. Previous research indicated that living alone predicts the likelihood of poor medication adherence among HIV positive patients<sup>34</sup>. Social networks as a buffer can affect HIV/AIDS patient's stress and developed their self-confidence and esteem. Being single increased the risk of having an unsuppressed viral load. In fact, those who are not alone receive social support and encouragement from members in their networks for the timely use of drugs, diet, and exercise consulting<sup>35</sup>.

In concordance with our finding, the results of other studies suggested that occupation status is related to adhering treatment. HIV stigma of people in the labor

market was associated with reduced medical treatment adherence<sup>36</sup>. Also, the economically inactive older adults have more free time and fewer concerns compared to other occupation groups. Thus, they care more about themselves and can participate in HIV community/groups and benefit from social support and information exchange.

Our study provides useful and important information about adherence to treatment especially among the older adults who living with HIV. However, there are some limitations that should be considered when interpreting the findings. The limitations of the present study included the inability to directly investigate the causal relationships between independent variables and HIV adherence to treatment. Besides, our data were based on participants' self-report and it may be a subject of social desirability bias. We might also misclassify the elderly with HIV based on adherence to treatment due to self-reporting. Further, the samples were not selected randomly, thus, the results need to be extrapolated to all elderly with HIV cautiously.

## CONCLUSION

Our findings contribute to the understanding of OALWH medical adherence to treatment. Regarding the low treatment adherence in this study, recommend the educational interventions affecting adherence to treatment especially among the older adults who are living alone and not employed. Further, psycho-educational programs should focus on techniques for increasing the positive mood and problem-solving capacity of elderly in AIDS counseling centers so that they can be adapted to the consequences of disease and adhere to their treatment. Moreover, doing qualitative studies for detecting the dimensions and factors related to adherence to treatment in HIV patients is suggested for further studies. It is important to reduce HIV stigma and improve the attitude of the public toward adherence to treatment in HIV infected older adults. Further, interventions to HIV-infected elderly who are living alone and not employed should be considered. Behavioral Counseling Clinics should hold well-being programs to help OALWH strengthen their positive mood and network to get social support to deal with challenges and finally succeed in adherence to treatment.

## KEY CONSIDERATIONS

- The adherence to treatment was low among Iranian older adults living with HIV/AIDS.
- HIV-infected older adults who are living alone, unemployed and those who have a negative mood as vulnerable groups needs to be paid more attention.
- Demographic determinants such as sex, education and living arrangement have a significant effect on treatment adherence and, therefore, should be given more attention during treatment planning.
- Behavioral Counseling Clinics should hold well-being programs to help OALWH strengthen their positive mood as a most important factor associated with adherence to treatment.

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