# **Original Research Article**

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# Adherence to anti-retroviral therapy and factors influencing it among HIV/AIDS adult patients in Agra: a cross-sectional study

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#### **ABSTRACT**

**Background:** HIV/AIDS remains a significant global public health problem. With approximately 56% HIV patients in India receiving treatment, adherence to drugs is a crucial element for successful management. Sustainable development goals, National Strategic plan for HIV/AIDS and STI (2017-24) and 90-90-90 target pushing towards ending of AIDS epidemic require adequate adherence and this research estimates the adherence, associated factors and reasons for non-compliance.

**Methods:** This analytical cross sectional study was undertaken on 160 HIV patients from an ART Centre. A prestructured, pilot tested, face validated questionnaire was used and data collected by face to face interviews, through random selection of participants from outpatient department register. Data was analysed using Epi Info software and chi squared test applied.

**Results:** Of the 160 study subjects, 86.8% remained adherent to the treatment with forgetfulness (71.4%) being the most common cause for non-adherence. Statistically significant treatment adherence was observed to be associated with socio-economic status (p=0.021) and period elapsed since diagnosis (p=0.041).

**Conclusions:** Improving adherence to drug therapy through intensive counselling, streamlined drug supply and increased family participation would go a long way in reducing the menace of HIV.

Keywords: HIV, AIDS, Adherence, Treatment

# INTRODUCTION

Treatment of HIV/AIDS is aimed at reducing death or to prolong life or to improve quality of life of people infected with HIV. In the world today efforts have been exerted to contain the pandemic by treating HIV positive people with newly discovered highly effective antiretroviral drugs. Where it has succeeded, antiretroviral therapy (ART) has altered the nature of the disease, transforming an almost uniformly fatal illness into a chronic but reasonably stable condition. The success of antiretroviral treatment largely depends on the frequency of use, adherence and effectiveness of drugs. Globally 59% of people living with HIV were receiving

antiretroviral treatment in 2017, however this percentage is lesser in India at 56%. <sup>1,2</sup> Currently the national adult (15–49 years) HIV prevalence in Uttar Pradesh (U.P.) is estimated at 0.09% [0.07-0.12] and has since plateaued. There are estimated 1.34 lakh [1.018-1.776] people living with HIV (PLHIV) in U.P. First line ART is provided free of cost to all eligible PLHIV through ART centers. Positive cases referred by Integrated Counselling and Testing Centers (ICTCs) are registered in ART center for pre-ART and ART services. Patients are also provided counselling on adherence, nutrition, positive prevention and positive living. Follow up of patients on ART is done by assessing drug adherence, regularity of visits, periodic examination and CD4 count.

The sustainable development goals (SDGs) aim to achieve end of AIDS as a public health threat by 2030. As a signatory, India stands committed to achieve this goal through its National AIDS Control Programme. National Health Policy (NHP 2017) and National Strategic Plan for HIV/AIDS and STI 2017-2024 reiterate to achieve End of AIDS through a well-defined roadmap and has articulated medium term targets for 2020. The recent launch of Mission 'Sampark' (i.e. Contact), which aims to facilitate identification and contacting of ART patients who have been lost to follow-up to bring them back into the ART programme and foster treatment adherence for lasting viral load suppression, is a promising step in this regard.<sup>3</sup>

India specific data on adherence is few and far between and this research aims to explore adherence rates, its associated factors and the causes for non-adherence to treatment.

#### **METHODS**

This analytical cross sectional study was undertaken on 160 HIV patients from the ART Centre of a governmental medical college in Agra. Permission for the study was sought from principal of the college, officer-incharge of ART centre and Institution Ethics Committee.

#### Inclusion criteria

Inclusion criteria were patients registered at ART Centre of a governmental medical college in Agra; those who are taking ART for at least 3 months.

# Exclusion criteria

Exclusion criteria were those who refused to participate in the study; critically ill patients; age less than 18 yr.

The pre-structured, pilot tested, face validated questionnaire consisted of questions relating to sociodemographic profile, addiction, family support, disclosure status, CD4 count, adherence status and time since diagnosis.

Sample size was calculated using 73% as the prevalence rate of adherence to ART as observed by Shah et al.<sup>4</sup>

$$N = Z^2 \alpha / 2 PQ/L^2$$

Thus substituting  $Z\alpha/2=1.96$ , P=73%, Q=100-P=(100-73)%=27%, L=10% of P and allowing 10% margin for incomplete questionnaires; the sample size was rounded off to 160.

3 patients were randomly selected from the OPD register of ART centre each day and the process was continued till the desired sample size was fulfilled. A written informed consent was obtained in the local language and each subject fulfilling eligibility criteria was individually interviewed in privacy. Data was analysed in Epi Info using chi square test and p value<0.05 was taken as statistically significant

Adherence to drug-adherence of >95% was considered as adherent and <95% non-adherent.<sup>5</sup>

# **RESULTS**

Of the total 160 participants there was a slight rural predominance (51.2%) with 1.6:1 male to female ratio. Majority of the patients (86.8%) remained adherent to the treatment. Adherence to ART was more among males (89.8%) as compared to females (82.3%) Study subjects residing in rural area were more adherent to ART (92.5%) than their urban counterparts (81.0%). In present study as the adherence to ART was nearly similar, in those having family support (87.3%) and lacking it (85.2%). Among disclosed study subjects, 11.1 percent subjects were found to be non-adherent while 14.8 percent of subjects with non-disclosed HIV status were found non-adherent to ART. Statistically significant treatment adherence was observed to be associated with socio-economic status (p=0.021) and period elapsed since diagnosis (p=0.041). Adherence was more in age group 30-44 years, males, rural residents, literates above primary education, married, non-alcoholics and with family support, but these factors were statistically insignificant (Table 1).

Table 1: Adherence to treatment and its associated factors.

	Categories	Adherence level		Total (0/)	
Variable		Adherent (n=139) (>95%)	Non-Adherent (n=21) (<95%)	Total (%) (n=160)	P value
Age group (in years)	18-29	29 (80.5)	7 (19.5)	36 (100)	0.530
	30-44	68 (88.3)	9 (11.7)	77 (100)	
	45-59	37 (88.1)	5 (11.9)	42 (100)	
	>60	5 (100)	0 (0)	5 (100)	
Sex	Male	88 (89.8)	10 (10.2)	98 (100)	0.169
	Female	51 (82.3)	11 (17.7)	62 (100)	
Residence	Urban	64 (81.0)	15 (19)	79 (100)	0.09
	Rural	75 (92.5)	6 (7.5)	81 (100)	
				29 (100)	

Continued.

Variable	Categories	Adherence level		Total (%)	
Variable		Adherent (n=139) (>95%)	Non-Adherent (n=21) (<95%)	(n=160)	P value
Literacy	Illiterate	42 (85.7)	7 (14.3)	49 (100)	0.982
	Primary	25 (86.2)	4 (13.8)	29(100)	
	Above Primary	72 (87.8)	10 (12.2)	82 (100)	
Marital status	Married	114 (86.3)	18 (13.7)	132 (100)	0.866
	Unmarried	19 (90.5)	2 (9.5)	21 (100)	
	Widow/er	6 (85.7)	1 (14.3)	7 (100)	
Socio economic	Class I	4 (66.7)	2 (33.3)	6 (100)	0.021*
class	Class II	14 (70)	6 (30)	20 (100)	
(Modified B G	Class III	31 (86.1)	5 (13.9)	36 (100)	
Prasad	Class IV	48 (87.3)	7 (12.7)	55 (100)	
Classification)	Class V	42 (97.7)	1 (2.3)	3 (100)	_
A111	Present	26 (86.7)	4 (13.3)	30 (100)	0.0970
Alcohol use	Absent	113 (86.9)	17 (13.1)	130 (100)	
Tobacco use	Present	55 (90.2)	6 (9.8)	61 (100)	0.334
	Absent	84 (84.8)	15 (15.2)	99 (100)	
C	Present	110 (87.3)	16 (12.7)	126 (100)	0.846
family support	Absent	29 (85.2)	5 (14.8)	34 (100)	
disclosure	Disclosed	64 (88.9)	8 (11.1)	72 (100)	0.495
status	Not disclosed	75 (85.2)	13 (14.8)	88(100)	
CD4 count	<350	84 (85.7)	14 (14.3)	98 (100)	0.505
	>350	55 (88.7)	7 (11.3)	62 (100)	0.585
Time since	<5 yr	110 (91.6)	10 (8.4)	120 (100)	0.041*
diagnosis	>5 yr	29 (72.5)	11 (27.5)	40 (100)	

A total of 13.1 percent of study subjects reported missed dose in the last week. Forgetfulness was most commonly (71.4%) observed reason for a missed dose. Side effects of drugs (14.2%), under supply of drug (9.6%) and did not take medicine because feeling better (4.8%) were also cited as reasons for a missed dose (Table 2).

Table 2: Cause of non-adherence to treatment.

Reason for a missed dose in last week	Number of individuals	Percentage (%)
Just Forgot	15	71.4
Side effects of drug	3	14.2
Drugs unavailability	2	9.6
Feeling better	1	4.8
Total	21	100

## DISCUSSION

Adherence to ART is critically important for successful treatment of HIV/AIDS. In the present study measuring patient's adherence to ART by self-report we found that 86.9% patients were more than 95% adherent to their prescribed regimen in the recall period of previous seven days.

Among males 89.8% were (more than 95%) adherent to ART as compared 82.3% female subjects, although the difference is statistically insignificant. In congruence to

our study, Lal et al, Asmare et al, Shigdel et al, Shukla et al also found 90%, 88.6%, 86.7%, and 89.1% mean adherence to ART respectively. In contrast to our study Venkatesh et al and Rai et al reported comparatively lower mean adherence (51% and 57% respectively). In this may be because the recall period of these studies was more than 30 days. Sarna et al showed very high level of adherence at 100% which may be because the adherence was assessed for 4 and 3 days respectively for above studies. In the same of the sa

In present study, statistically significant difference was not observed in mean adherence of both sexes. Unlike our study Venkatesh et al from Chennai showed that females had comparatively lower of adherence to ART as compared to males (34% and 66% respectively).<sup>10</sup>

In the present study older subjects showed a tendency toward better adherence to ART medication than younger subjects; but the differences were not statistically significant. Similarly Sarna et al, Rai et al and Venkatesh et al also reported no significant association of age with adherence. Though Shigdel et al showed that ART adherence decreased significantly with increasing age. This variation can be explained by taking into account that this was a multisite setting conducted in Nepal with entirely different socio-cultural milieu and low literacy.

In this study, association of marital status was not observed with adherence to ART. Similar to our finding,

a study by Shukla et al (also demonstrates no association of adherence with marital status but a study by Asmare et al reported association of adherence with marital status.<sup>7-9</sup>

In present study adherence was higher among rural subjects (92.5%) than urban (88.5%) but the association is not statistically significant. Similarly Shukla et al did not found association of residence with adherence level among study subject.<sup>9</sup>

In our study effect of literacy is not observed on adherence level. In congruence Rai et al also reported no significant difference between the level of adherence and education status, though Sarna et al found lower education associated with lower level of adherence which may be because the study subjects were drawn from a private hospital a setting with entirely different proportion of subjects in various literacy levels. 11,12

In current study association of alcohol consumption was not observed with adherence. In congruence Shukla et al and Banagi et al have also shown that alcohol consumption is not associated with lower adherence. <sup>9,13</sup> Contrarily Venkatesh et al and Shigdel et al have reported significant association of alcohol with adherence level. <sup>8,10</sup> The differences may be due to variation in criteria for considering a subject alcoholic.

In present study, adherent subjects were 87.3% and 97.7% respectively among study subjects who belonged to lower middle and lower class, this was higher than upper middle and upper class (66.7% and 70% respectively). This difference was statistically significant. In congruence to our study, Shah et al found higher level adherence among lower socioeconomic group as compared to upper socioeconomic group.<sup>4</sup> Shukla et al applying multivariate regression however reported upper class were more adherent to ART than lower socioeconomic class.<sup>9</sup>

In this study association of adherence was not observed with family support. Similar to our finding Sarna A et al (2008) also found no association of adherence with family support. Contrarily Gokarn et al found that family support effected adherence to ART. The difference might be because of difference in criteria of family support in their study.

In our study social disclosure of HIV status was not found significantly associated with adherence. In congruence to this finding, Sarna et al also demonstrated no association of adherence with disclosure of HIV status. <sup>12</sup> On the contrary, Gokarn et al considering recall period of one month for adherence observed that who have not disclosed HIV status to anyone were more likely to be non-adherent. <sup>14</sup>

Significant effect of duration (since diagnosis of HIV) was observed on adherence level. Adherence to ART was found to decline with increasing duration (since diagnosis

of HIV). It may be due to the decrement in disease and its consequences related fear with advancing time. On contrary to our study in Venkatesh et al and Sarna et al have found increasing adherence to ART with increasing duration of illness. <sup>10,12</sup> Both of these studies were conducted at cosmopolitan cities and the study subjects were derived from private institution/Hospitals, obviously the subjects a likely to belong to middle or higher socioeconomic class with higher literacy status; thus more sustained adherence to ART.

The most common reason for non-adherence was forgetfulness (68.6%) and side effect of drug (16.4%) followed by feeling better (9.5%) in our study. Few subjects (5.5%) ran out of drug because of untimely follow-up.

In consonance to our finding studies viz. Sarna et al, Banagi et al, and Shukla et al have also shown most common reason for non-adherence is 'forgot taking drug' and other reasons include; 'travelled out of town', 'ran out of medication', 'no money to visit ART centre', 'drug reaction', 'work demands'. 9-13

# **CONCLUSION**

To conclude non-adherence to treatment in HIV patients is multi factorial and these dimensions need to be addressed through participative counselling, adequate drug supply, and increased awareness in community, social acceptance and family support.

## Recommendations

- In a progressive society patients show higher adherence, efforts should be made to further improve the social acceptance of HIV patients.
- Higher the education for better the adherence, so energy should be directed to better the education level of ART patients.
- With advancing time, patients tend to be non-adherent and majority of candidates forget to take medicine because of being busy in other work, it signifies the role of counsellor. Strengthening of counselling services needs to be endeavoured. Some innovative approach like reminder to take medicine on time by timers with alarm, by text messaging on mobile phone can also work to keep adherence at optimum level.
- Being a government institution, government is solely responsible for uninterrupted drug supply, so government should be held liable for it as one of the reasons for missed dose was drug ran out due to shortage.

# Limitations

 Being a government set-up, people from upper socioeconomic class don't prefer to take treatment here.
Most of the people in sample are from lower class.  In spite of the best motivation from the investigator the respondents might not have given complete and unbiased information.

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