ORIGINAL ARTICLE

Assessment of adherence to Anti -Retroviral Therapy (ART) and its associated factors among the People living with HIV (PLHIV) attending ART centre, in a tertiary care hospital, Jammu, UT of J&K (India)

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ABSTRACT

Background: Adherence to antiretroviral Therapy has played a key role in enhancing the life years of PLHIV. At least 95% of adherence rate is needed for the optimal suppression of HIV virus. The present study is aimed to assess adherence to ART and its associated factors among PLHIV in a tertiary care centre in Jammu, UT of Jammu & Kashmir. **Methods**: This cross-sectional study was conducted for a period of six months w.e.f. May-Oct 2025. The information was collected from 280 patients about their socio- clinical profile and possible factors contributing to non- adherence. Adherence to ART was assessed using Simplified Medication Adherence Questionnaire. Data was analyzed using SPSS version 27. **Results**: Mean age of participants was 42±13.44 years and overall adherence was 90.4%. Most common reason for non- adherence was forgetfulness and difficulty in accessibility to ART. Among the variables, history of substance abuse, current state of relation with spouse and monthly income were significantly associated with adherence to ART ($p < 0.05$). **Conclusions**: High adherence levels were likely due to free availability of ART and mobilization by health care workers. Monitoring of non-adherence behaviours among respondents can help to increase adherence levels and this will lead to improvement in treatment outcomes.

KEYWORDS

Adherence, ART, PLHIV, Jammu

INTRODUCTION

HIV/AIDS is a significant public health problem. An estimated number of 0.7% (0.6-0.8%) adults who were between the age of 15 to 49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions.[1] People Living With HIV (PLHIV) are receiving Antiretroviral Therapy (ART) which has drastically reduced the burden of mortality.[2] However, the clinical outcome of ART depends essentially on the adherence of PLHIV to ART. Adherence is defined as ability of the patient to follow a prescribed treatment plan, taking medications at scheduled times and frequencies, and follow restrictions regarding food and other medications.[3]Acquired HIV drug resistance can occur when an individual has poor adherence to ART,[4] though this can vary, depending on the class of antiretrovirals. Several studies conducted among PLHIV have shown various factors that are likely to influence adherence to ART including side effects to medication, distance to the ART centre, stigma/discrimination, alcohol or substance abuse and non-disclosure of HIV status. Adherence is one of the major critical issues in the clinical management of HIV-infected patients receiving ART. This study was planned to assess the level of adherence to ART and possible associated factors in PLHIV who were registered at ART centre GMC Jammu.

Aim & Objective(s)

- To assess the adherence to antiretroviral therapy (ART) among patients living with HIV (PLHIV)
- To determine the association of various factors with adherence to ART among these patients.

MATERIAL & METHODS

Study design and Study population: This cross-sectional study was conducted on patients living with HIV (PLHIV) and receiving treatment since last six months from ART centre, Government Medical College, Jammu.

Study duration: This study was conducted for a period of 6 months.

Sample size and sampling technique: Patients living with HIV and receiving treatment at ART Centre since last 6

months were recruited in the study using consecutive sampling, considering 70% prevalence (5) of adherence to ART and relative precision of 8% and 5% non-response rate, the sample size calculated was 280 using the formula $4pq/d^2$, where p = prevalence, q = 100-p and d= relative precision.

Inclusion Criteria :

- Patient living with HIV(PLHIV) attending at ART centre of GMC Jammu who:
- were registered in ART centre
- were on antiretroviral therapy since last 6 months
- were willing to participate in the study.

Exclusion Criteria:

- PLHIV who were on ART ≤ 6 months.
- PLHIV who were not willing to participate.
- PLHIV with cognitive impairment.
- PLHIV belonging to vulnerable population.

Data collection technique: Before starting the study, ethical approval was taken from the IEC, GMC Jammu vide no. IEC/GMCJ/2025/2122 dated 11.03.2025 and due permission was sought from the J&K AIDS Control Society Jammu. All eligible participants were recruited in the study by the principal investigator during OPD hours at ART centre GMC Jammu. The principal investigator explained the purpose of study to each participant in their local dialect and assured the participants about the confidentiality of all the information gathered. Thereafter, written informed consent was taken from the participants who were willing to participate and only those who gave informed consent were interviewed. The interview was conducted according to the predesigned semi structured proforma and specific questionnaires. The researcher began the interview by administering the proformas containing questions regarding socio-demographic details, clinical details and possible factors contributing to non-adherence. Simplified Medication Adherence Questionnaire (SMAQ) was used to measure treatment adherence.

Study tool: The SMAQ6 questionnaire was used to measure adherence to antiretroviral treatment in people living with AIDS. The SMAQ questionnaire has been widely used in the previous research studies. This questionnaire consists of six questions with dichotomous answers (Yes/No) that assess the different aspects of patient's compliance with treatment including forgetfulness to take medicine, routine, adverse effects and a quantification of omissions. A patient is identified as "non-adherent" if he/she responds to any of the questions with a non-adherence answer and for quantification, if the patient has lost more than two doses during the last week or has not taken medication for more than two complete days during the last three months.

Statistical analysis: The collected data was entered into Microsoft excel sheet and was analysed using SPSS version 27.0 software. Categorical data was quantified as proportions while mean (SD) were used to report quantitative variables. Odd's ratio with corresponding 95% confidence interval was used to find out the association of various factors with non-adherence to ART. Statistical significance was calculated using chi-square/Fischer Exact test. A p- value of < 0.05 was considered as statistically significant.

RESULTS

A total of 280 participants receiving antiretroviral therapy (ART) at the ART Centre, GMC Jammu, were included in the study. The mean age of the participants was 42±13.44 years. Males constituted 57.1% of the study population. A predominantly rural residence was observed (86.1%), and Hinduism was the most common religion (88.9%). 42.5% having completed secondary or higher secondary education, with majority in the middle-income group (5001–25,000 INR; 66.1%). 66.8% of the participants were married and living with their spouse. Among spouses/partners, 52.9% were HIV positive. Disclosure rate of HIV status was high, with 97.5% of the respondents reporting that their partner or family was aware.

ART initiation occurred within 3–12 weeks of diagnosis in 99.3% of cases. First-line ART regimens were used by 96.1% of participants. Side effects were reported by only 4.6% participants, and 13.2% had experienced opportunistic infections. Substance abuse was reported by 19.3% of participants.

The median duration since HIV diagnosis was between 6 months to 5 years in 53.2% of participants. The predominant route of transmission was unprotected sexual contact (63.6%) while in 23.6% of cases, the route of transmission was unknown.

ART Adherence

Adherence was measured by the Simplified Medication Adherence Questionnaire (SMAQ), in which adherence was defined as when the participants did not forget to take medication for two or more days in the last week which was calculated as (90.4%)

A comparatively higher adherence was observed in participants who were < 30 yrs old, females, urban residents, and educated up to graduate & above level. Adherence was 12 times higher in those who were not abusing any substance than those who show some form of substance abuse. Also, adherence was 3 times more in those whose monthly income was above 5000 INR as compared to those who earn less than 5000 INR.

A statistically significant association of adherence was seen with present history of substance abuse (p = 0.000), current state of relation with spouse/family (p=0.001) and monthly income (p=0.02). (Table 1)

After studying the clinical profile of PLHIV on ART, it was observed that factors like absence of any opportunistic infections, disclosure of HIV status to spouse/family, intake of minimum number of pills per day, absence of side effects and early initiation of ART therapy, increased adherence to ART (Table 2).

As shown in Figure 1, the most common reason for non-adherence observed was forgetfulness to take medication (45,5%) followed by difficulty in accessibility (12,1%).

Table 1: Association of various socio-demographic variables with adherence to ART in PLHIV (n=280)

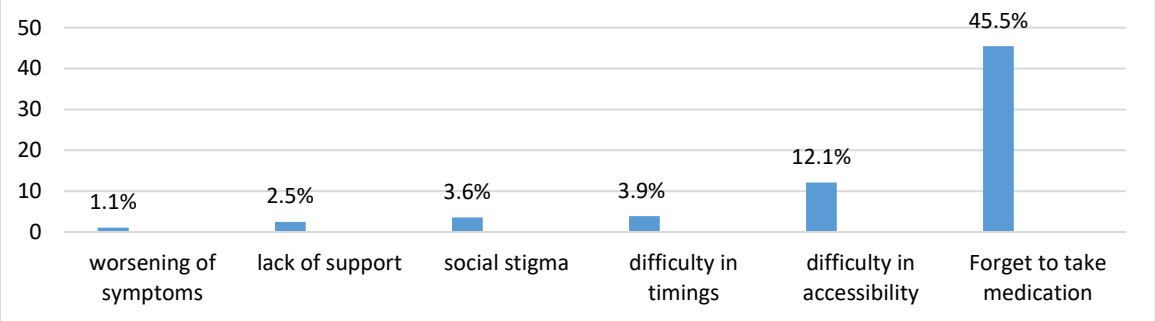
Variables	Total (280) N (%)	Adherence (253) N (%)	Non-Adherence (27) N (%)	Crude Odd's Ratio (CI)	P Value
Age (years)					
<30	62(22.1)	56(90.3)	6(9.7)	1.05(0.39-2.61)	0.99
≥30	218(77.9)	197(90.4)	21(9.6)	1	
Gender					
Male	160(57.1)	143(89.4)	17(10.6)	1	
Female	117(41.8)	107(91.5)	10(8.5)	1.28(0.56-2.91)	0.785
Transgender	03(1.1)	03 (100)	0 (0)	undefined	
Marital status					
Married	187(66.8)	169(90.4)	18(9.6)	1	
Unmarried	53(18.9)	47(88.7)	6(11.3)	0.81 (0.30- 2.17)	0.827
Separated	40(14.3)	37(92.5)	3(7.5)	1.07 (0.28- 3.81)	
Residence					
Rural	240(85.7)	215(89.6)	25(10.4)	1	
Urban	40(14.3)	38(95)	2(5)	2.22(0.50-9.76)	0.294
Religion					
Hindus	249(88.9)	226(90.8)	23((9.2)	1.45(0.46-4.51)	0.518
Others	31(11.1)	27(87.1)	4(12.9)	1	
Educational status					
Illiterate to primary					
High school to graduate and above	81(28.9)	71(87.7)	10(12.3)	1	0.332
	199(71.1)	182(91.5)	17(8.5)	1.48(0.65-3.38)	
Monthly Income (INR)					
< 5000					
5000-25000	79(28.2)	65(82.3)	14(17.7)	1	0.022
≥25000	185(66.1)	173(93.5)	12(6.5)	3.11(1.37- 7.06)	
	16(5.7)	15(93.8)	01(6.2)	3.23(0.39-26.51)	
Current state of relation with family.					
Living Alone					
Living With spouse/Family	18(6.4)	11(61.1)	7(38.9)	1	0.001
	262(93.6)	242(92.4)	20(7.6)	7.70(2.69-22.04)	
Occupation					
Unemployed	143(51.1)	134(93.7)	9(6.3)	1.43(0.37-5.48)	
Self -employed	82(29.3)	70(85.4)	12(14.6)	0.56(0.14-2.12)	0.251
Pvt job	27(9.6)	24(88.9)	3(11.1)	1.04(0.19-5.67)	
Govt job	28(10)	25((89.3)	3(10.7)	1	
Substance abuse					
Yes	54(19.3)	36(66.7)	18(33.3)	1	
No	226(80.7)	217(96.0)	09(4.0)	12.06(5.03-28.9)	0.001

Table 2: Association of various clinical characteristics of PLHIV with adherence to ART (n=280)

Variables	Total N (%)	Adherence N (%)	Non-Adherence N (%)	Crude Odd's Ratio (CI)	P Value
History of opportunistic infections					
Yes	37(13.2)	33(89.2)	04(10.8)	1	0.796
No	243(86.8)	220(90.5)	23(9.5)	1.16(0.37-3.56)	
HIV status of spouse					
Positive					
Negative	148(52.9)	133(89.9)	15(10.1)	1	0.964
Not known	70 (25)	64(91.4)	6(8.6)	1.20(0.45-3.25)	
	62 (22.1)	56(90.3)	6(9.7)	1.05(0.39-2.85)	
Time since diagnosis					

Variables	Total N (%)	Adherence N (%)	Non-Adherence N (%)	Crude Odd's Ratio (CI)	P Value
6 M- 5 years					
5 - 10 years	148 (52.8)	138(93.2)	10(6.8)	2.40(0.99-5.83)	0.145
>10 years	51(18.2)	46(90.2)	5(9.8)	1.60(0.53-4.85)	
	81(28.9)	69(85.2)	12(14.8)	1	
Number of Pills(daily)					
1 tablet					
>1 tablet	258(92.1)	245(94.9)	13(5.1)	2.35(0.30-18.2)	0.399
	22(7.9)	19(86.4)	3(13.6)	1	
HIV status known to spouse/partner					
Yes					
No	271 (96.8)	244 (90.0)	27 (10.0)	1.13	0.842
	09 (3.2)	08 (88.9)	1 (11.1)	(1)	
ART drugs used					
First line	269 (96.1)	242 (89.9)	27 (10.1)	0.89	0.996
2nd line	11 (3.9)	10 (90.9)	1 (9.1)	1	
Co-morbidities					
Yes	13 (4.6)	12(92.3)	1(7.7)	1.35	0.866
No	267(95.4)	240(89.9)	27(10.1)	1	
Experienced side effects					
Yes					
No	13(4.6)	12(92.3)	1(7.7)	1.23(0.92-6.18)	0.699
	267(95.4)	241(90.3)	26(9.7)	1	

Figure 1: Reasons for the non- adherence to ART among PLHIV



DISCUSSION

The present study has tried to elucidate adherence of ARV therapy among users receiving treatment from ART centre, in a tertiary care hospital . The mean age of the participants was 42±13.44 years and males constituted 57% of the total respondents . Goma F et al in a study from Greece reported mean age of respondents to be 37.14± 7.7 years but males were 89.3% of the total,(7) while Neupane S et al reported mean age being 38.55±6.84 years among the respondents. Majority of the respondents in the present study were Hindu by religion which is in consonance with the results reported by Neupane S et al from Nepal.8 Disclosure rate was 97.5 % among the respondents but in contrast, Neupane S et al reported a lower disclosure rate of 80.1 %.(8) The high disclosure rate shows that stigma towards HIV has reduced.

In the treatment of HIV patients, adherence to ART remains the biggest challenge. Adherence is the extent to which the patient takes the drug as per recommendations of the healthcare provider.9 The overall adherence in the present study was found to be 90.4%. These higher rates of adherence are likely due to effective mobilisation by healthcare workers in the community which has led to higher awareness about the disease in the community. Free ART under NACP is likely to be the another reason. The non adherence rate of 9.6 % is also a cause of concern as it will lead to increased morbidity and mortality. The SMAQ tool indicated that the most common causes for non- adherence were forgetting to receive ART and difficulty in accessibility. The adherence rates were in agreement with those reported by Neupane S et al ,Wasti SP et al, Shigdel R et al and Pahari S et al.(8,10-12) Bam K et al reported 94.8% adherence rate where the sample size was larger than the present study and also was representative of 12 ART sites of Nepal.(13) However, some authors have reported lower adherence rates.(14,15) Among the reasons of varied rates of adherence, were difference in age group of the respondents and accessibility to ART. Also, the

different tools used to assess the adherence may have led to varied rates of adherence among the respondents. Similarly Goma F et al from Greece reported that 6 out of 10 participants were non adherent to ART and authors have attributed it to the socioeconomic burden of the population.(7) The results have revealed that variables like present history of substance abuse , current state of relation with family and monthly income were significantly associated with adherence to ART. Neupane S et al reported gender, family type , alcohol habit , HIV duration and side effects as strong predictors of ART adherence.8Wasti SP et al also reported similar results.(10)

Goma F et al reported that variables like place of residence, educational level, use of narcotic substances and social support were related to adherence.(7) The influence of narcotic on adherence to ART has been reported by many authors.(16-18)

Conclusion

Although adherence rate of 90.4% seems to be encouraging in a developing country, yet achieving universal adherence remains a challenge. We need consistent counselling and motivation for this purpose. The variables like substance abuse, relation with spouse/family and monthly income were significantly associated with adherence.

Recommendation

The factors like substance abuse, relation with spouse/family and monthly income associated with non-adherence should be addressed so that the desired level of adherence would be achieved.

Limitation of the Study

No causal relationship can be made due to cross-sectional nature of the study. The adherence levels were measured at one point of time whereas medication adherence is dynamic and respondents' behaviour may change overtime

Relevance of the Study

As discussed in this study adherence to ART play a crucial role for the better treatment outcomes. This Study highlights the need for period assessment of adherence to ART therapy.

Authors Contribution

All authors have contributed equally.

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Nil

Conflict of Interest

There are no conflicts of interest.

Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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