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Adherence to antiretroviral treatment and associated factors among people living with HIV and AIDS in Kapilvastu district, Nepal

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Abstract

Introduction: Human immunodeficiency virus (HIV) is a public health problem. This study aimed to assess the adherence to antiretroviral therapy (ART) and associated factors among people living with HIV and acquired immunodeficiency syndrome (AIDS) in Kapilvastu district of Nepal.

Method: A community-based cross-sectional study was conducted from Dec 2023 to Mar 2024, involving adult HIV positive patients in Kapilvastu district, Nepal. Participants were selected using a convenience sampling technique. Data were collected using face to face interviews from consented patients ≥18 years of age and on ART for at least 6 months. Patients who were mentally unfit and severely debilitated were excluded. Sociodemographic variables and adherence questionnaires based on Adult AIDS Clinical Trial Group were used. Ethical approval (UCMS/IRC/009/23) was taken from Universal College of Medical Sciences, Bhairahawa, Nepal. Data analysis was done using SPSS 20. Descriptive statistics, Chi-square tests and binary logistic regression were utilised. The level of significance was set at a $p \leq 0.05$.

Result: The overall ART treatment adherence was 172(83.9%) among 205 patients. Alcohol consumption, thought of stopping ART treatment, reasons for not disclosing HIV status and means of reaching ART centre were found to be significantly associated with ART treatment adherence.

Conclusion: This study highlighted a non-adherence rate of 16.1% to ART in HIV and AIDS patients, which remains an issue for treatment resistance and escalating morbidity and mortality.

How to cite

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Introduction

Human Immunodeficiency virus (HIV) continues to be a major global health issue.[1] Antiretroviral therapy (ART) is the primary treatment for HIV and can help to suppress the virus and prevent the progression to AIDS. World Health Organisation defines adherence as “the extent to which a person’s behaviour in taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a health-care provider”.[2] In Nepal, there were a total of 754 new HIV infections in 2020, a prevalence of 0.13% among the population, 83% of people living with HIV knew their status, 79% were on treatment, and 49% were virally suppressed.[3] More than 95% adherence to ART is required to prevent the emergence of resistant HIV strains, obtain long-term HIV suppression, reduce destruction of CD4 cells, increase survival, and improve quality of life.[4,5] Poor ART adherence can create a dangerous public health problem and limit the effectiveness of available HIV treatment.[6]

In order to achieve success in the ART programs, first priority should be given to treatment adherence, and for that, it is important to identify the determinants affecting adherence to ART.[7] Despite the availability of free ART services in Nepal since 2004, adherence to ART remains a challenge. This study aims to find out the adherence and influencing factors among ART-ART-prescribed patients in Kapilvastu district, Nepal.

Method

A cross-sectional study was conducted from Dec 2023 to Feb 2024 among all HIV positive patients registered in the ART/HTC centre of Kapilvastu district hospital, Province 5, Nepal, to assess the adherence rate of ART regimen and associated factors among people living with HIV in Kapilvastu district, Nepal. A total of 205 participants aged more than 18 years were included in the study population. The sample size for the present study was calculated using Cochran’s formula, $n=(Z^2pq)/e^2$, considering the prevalence of adherence (p=81.8%, q=1-p), and possible non-response rate where Z=1.96 at a 95% confidence interval level and 5% stands for margin of error (e).[8] The population was selected by convenience sampling method. The questionnaire was adopted from Adult AIDS Clinical Trial Group (AACTG) adherence questionnaire.[9] The questionnaire was translated into Nepali by the main author and then translated back to English by co-authors. All authors are good at both Nepali and English as they have completed 16 years of schooling in English medium and are native Nepali speakers.

Clients taking ART were face to face interviewed with a structured questionnaire till the required sample size was met by the field workers with a public health bachelor's degree after being trained by the principal investigator (PI). Socio-demographic variables, personal factors, treatment-related and health service facility-related variables, duration of infection, duration of treatment, distance and time to reach ART centre and cost per visit were the independent variables whereas treatment adherence was the dependent variable. Adherence was classified as adherent (0-2 doses missed in past 30 days) or non-adherent (missed ≥ 3 doses in past 30 days) based on number of doses missed in the past 30 days.[10-13]

Ethical clearance was obtained from the Institutional Review Committee of Universal College of Medical Sciences (UCMS), Bhairahawa (UCMS/IRC/009/23), Nepal. Respondents were assured that the information provided would only be used for research purposes, and confidentiality would be maintained. Informed written consent was obtained. Participation in the research was voluntary, and participants could withdraw at any time.

The collected data were entered, edited and analysed through into SPSS version 20. Descriptive analysis was done in terms of frequency and percentage. The relationship between independent and dependent variables was shown using Chi-square test. Sample logistic regression. The level of significance was set at p<0.05. The adjusted odds ratio was computed and presented with a 95% confidence interval.

Result

Among 205 participants, 120(58.5%) were males, minimum age 19 years and maximum 60 years, 49(23.9%) were in age group 15-24 years, 120(58.5%) married, and 128(62.4%) illiterates. In terms of occupation, 128(61.5%) were skilled workers, 177(86.3%) Hindus, Table 1. Out of the 205 participants, 172(83.9%) were adherent and 33(16.1%) were non-adherent to the ART in the last month, Table 2.

Among the socio-demographic variables and ART adherence, a significant association was found only with religion (p=0.001), Table 3.

Association between ART adherence and factors related to personal, treatment and health service facility revealed a significant association with current alcohol consumption, current smoking status, thoughts of stopping treatment and getting help, Table 4.

Table 1. Socio-demographic of HIV positive patients surveyed for adherence to ART regimen, n=205

Variables	n	%
Gender		
Male	120	58.5
Female	85	41.5
Age in years (min 19 years, max 60 years)		
15-24	49	23.9
25-34	45	22.0
35-44	58	28.3
45-54	40	19.5
>55	13	6.3
Marital Status		
Married	120	58.5
Unmarried	36	17.6
Separated/Divorced	49	23.9
Education		
Illiterate	128	62.4
Literate	77	37.6
Occupation		
Professional	14	6.8
Managerial	19	9.3
Skilled	126	61.5
Unskilled	23	11.2
Unemployment	23	11.2
Religion		
Hindu	177	86.3
Others	28	13.7

HIV- Human immunodeficiency virus, ART- Antiretroviral therapy

Table 2. Over all ART adherence rate of last month, n=205

ART adherence rate of last month	n	%
Adherence	172	83.9
Non-adherence	33	16.1

Table 3. Association between ART adherence and socio-demographics of HIV positive patients, n=205

Variables	ART Adherent, 172, n(%)	Non- adherence, n=33, n(%)	$\chi 2$ test	p value
Sex				
Male	102(85.0)	18(15.0)	0.258	0.611
Female	70(82.4)	15(17.6)		
Age (in years)				
188-24	37(75.5)	12(24.5)	5.954	0.203
25-34	36(80.0)	9(20.0)		
35-44	51(87.9)	7(12.1)		
>=45	48(90.6)	5(9.4)		
Marital status				
Married	100(83.3)	20(16.7)	0.161	0.923
Unmarried	31(86.1)	5(13.9)		
Separated/Divorced	41(83.7)	8(16.3)		
Occupation				
Professional/Managerial	24(72.7)	9(27.3)		
Skilled	110(87.3)	16(12.7)	4.186	0.123
Unskilled/Unemployed	38(82.6)	8(17.4)		
Education				
Illiterate	106(82.8)	22(17.2)	0.003	0.584
Literate	66(85.7)	11(14.3)		
Religion				
Hindu	156(88.1)	21(11.9)	17.113	0.001
Others	16(57.1)	12(42.9)		

Non-smokers were 1.3838 times more likely to adhere to the ART compared to smokers, although this was not statistically significant (p=0.700). Non-alcohol consumers were 4.474 times more likely to adhere to the ART regimen compared to those who consume alcohol, and was statistically insignificant (p<0.05). Participants who belonged to the Hindu religion were 1.31 times more likely to adhere to the ART regimen compared to those of other religions, but this finding was statistically insignificant (p=0.74). Moreover, participants who did not consider stopping treatment were 4.67 times more likely to adhere to the ART regimen than those who thought of stopping ART (AOR 4.67, 95% CI 2.45-11.23, p=0.03). Participants who travelled to the ART centre on foot were 4.50 times more likely to adhere to treatment than those who used their vehicle (AOR 4.50, 95% CI 0.96-2.55, p=0.05), and this difference was statistically insignificant.

Moreover, participants who used public transport were 0.84 times less likely to adhere to ART than those who used their vehicle, although this finding was statistically insignificant (AOR 0.84, 95% CI 0.28-2.53, p=0.73), Table 5.

Table 4. Association between ART adherence and factors related with personal, treatment and health service facility, n=205

Variables	ART		χ2 test	p-value
	Adherent, 172, n(%)	Non- adherence, n=33, n(%)		
Current Alcohol consumption				
No	151(89.3)	18(10.7)	21.138	0.001
Yes	21(58.3)	15(41.7)		
Current Smoker				
No	157(83.5)	31(16.5)	0.258	0.012
Yes	15(88.2)	2(11.8)		
Thought of stopping treatment				
No	160(86.0)	26(14.0)	6.672	0.01
Yes	12(63.2)	7(36.8)		
Getting help				
No	25(69.4)	11(30.6)	6.759	0.009
Yes	147(87.0)	22(13.0)		
Duration of disease and treatment in years				
=<2years	25(75.8)	8(24.2)	1.932	0.165
>2 years	147(85.5)	25(14.5)		
Side effects of ART				
No	119(82.1)	26(17.9)	1.233	0.267
Yes	53(88.3)	7(11.7)		
Means of reaching ART centre				
Walking	10(58.8)	7(41.2)	8.684	0.013
Public transport	134(86.5)	21(13.5)		
Own vehicle	28(84.8)	5(15.2)		
Total time travel to ART centre				
<1 hour	112(84.8)	20(15.2)	1.032	0.597
1-2 hour	44(84.6)	8(15.4)		
>2 hour	16(76.2)	5(23.8)		
Total travel cost				
<100	28(77.8)	8(22.2)	1.213	0.271
>100	144(85.2)	25(14.8)		

Table 5: Logistic regression of socio-demographic factors, treatment related factors and health service facility related factors and ART adherence, n=205

Variables	COR(95% CI)	p-value	AOR (95% CI)	p-value
Smoking				
No	2.33(0.83-6.52)	0.109	1.38(2.67-7.14)	0.70
Yes	Ref			
Alcohol				
No	5.99(2.63-13.65)	0.01	4.47(0.90-22.25)	0.07
Yes	Ref			
Religion				
Hindu	5.57(2.32-13.38)	0.01	1.31(0.26-6.65)	0.74
Others	Ref			
Thought of stopping treatment				
No	3.59(1.29-9.96)	0.014	4.67(2.45-11.23)	0.03
Yes	Ref			
Means of reaching ART centre				
Walking	3.92(1.01-15.21)	0.03	4.50(0.96-2.55)	0.05
Public transport	0.88(0.31-2.53)	0.81	0.84(0.28-2.53)	0.73
Own vehicle	Ref			

Discussion

This study found that among 205 people living with HIV and AIDS majority (83.9%) of the participants followed their prescribed ART regimen, which appears to be relatively high, but it falls short of desired >95% adherence required to prevent the emergence of resistant HIV strains, obtain long-term HIV suppression, reduce destruction of CD4 cells, increase survival, and improve quality of life.[4,5] A 16.1% non-adherence found in present study is of concern. Similar findings were reported in another study conducted in Far West, Nepal and Haiti, where the prevalence rate of adherence was 84% and 82% respectively.[11,12] Other studies conducted in Chitwan, Nepal, and Kathmandu, Nepal, reported higher adherence rates of 87.4% and 86.7%, respectively.[9,13]

Present study found a significant association with current alcohol consumption, current smoking status, thoughts of stopping treatment and getting help. We found that adherence was slightly higher among those ≥35 years compared to those <35 years, although this difference was statistically not significant. Comparable results were noted in other studies conducted in Nepal, suggesting older individuals exhibit greater health awareness.[10,14] A combination of practical, educational, and emotional support strategies is necessary to improve adherence.

Men demonstrated higher adherence to the ART regimen compared to women, but the difference was not statistically significant. This variation could be linked to factors such as easier travel opportunities for men and higher rates of disclosure among them. Socio-cultural constraints for women more than men might contribute to lower adherence rates among females. Similar results were documented in a study conducted in Kenya.[15]

Married respondents demonstrated a higher adherence to the ART regimen compared to unmarried and separated/divorced individuals, although this relationship did not reach statistical significance. It might be because of the support they receive from their spouses.[16] Similar results were reported in another study conducted in Kathmandu, Nepal.[13,14] Education level did not exhibit a significant association with ART adherence in this study. Similar findings were reported in another study conducted in Haiti.[12]

Non-alcohol consumers showed higher adherence compared to alcohol consumers, but this was found to be statistically insignificant. Non-alcohol consumers could have a stronger sense of commitment to treatment and greater awareness of the importance of adhering to the ART regimen, and alcohol consumers might find it challenging to stick to a consistent medication schedule. Similar findings were noted in other studies conducted in Nepal, Myanmar, New York and South Africa.[13,17-19]

Non-smokers showed a trend towards being 1.3838 times more likely to adhere to the ART regimen compared to smokers, although this difference was not statistically significant. Consistent results were obtained in another study conducted in Nepal.[9]

Most participants who had received treatment for over two years showed greater adherence to the ART regimen, although this difference was not statistically significant. This pattern may be due to patients becoming more familiar with their medication over time, potentially leading to better management of their treatment and health condition. Furthermore, individuals who have been on long-term medication may have gained a greater understanding of the potential consequences of not adhering to the ART regimen. Similar results were observed in another study conducted in Chitwan, Nepal.[9]

Strategies such as regular ART adherence education, counselling, improving medication, self-management skills, using reminders, enhancing adherence monitoring, and strengthening healthcare services are critical for improving adherence rates. Additionally, supportive social policies and environments tailored to people living with HIV can further enhance adherence rates.

This was a cross-sectional study, so it does not allow for establishing a causal relationship between ART adherence and the constructs of the Health Belief Model. Participants were aware that they were part of the study and might have responded differently, and were prone to a

Hawthorne effect. There may be a recall bias on missing doses and duration. With these limitations, our findings may still provide insights for further research and necessary intervention to increase the adherence to ART.

Conclusion

The adherence rate for ART was found to be 83.9%, indicating that 16.1% of patients are non-adherent, which presents a significant challenge to the desired target of >95% adherence. There was significant association between adherence with current alcohol consumption, smoking status, thoughts of stopping treatment and getting help. Identifying and addressing barriers is crucial to improve treatment outcomes.

Author contribution

Concept design: NS, GV; Literature search: NS, JP; Data collection: KTS, RS; Data analysis: JP, SKS; Draft manuscript: All; Final manuscript and accountability: All

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Conflict of interest

None

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Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

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Questionnaire/tools

Code No.: …………………

Consent form

Namaskar, I am Dr. Neelam Shrestha, a lecturer at Universal College of Medical Sciences, Bhairahawa. I am conducting a research study to assess adherence to antiretroviral treatment and associated factors among people living with HIV and AIDS in Kapilvastu District, Nepal. You are invited to participate in this study. Your participation is highly appreciated, and I assure you that all the information you provide will be kept strictly confidential. The data will not be disclosed and will be used solely for research purposes. Your rights as a participant will be fully respected.

Participant's Signature: ………………. **Date: ………………..**

Name: ……………………………………………….
Serial Number: …………………………………..
Address: Permanent ……………………………. Temporary: ……………………………….
Date of HIV Diagnosis: ……………………………………………….
Date of Starting ART: ……………………………………………….

1. **Age:** ……………………
2. **Sex:**
   1) Male 2) Female
3. **Caste:**
   1) Brahmin 2) Chhetri 3) Tharu 4) Dalit 5) Janajati 6) Other
4. **Religion:**
   1) Hindu 2) Buddhist 3) Islam 4) Christian 5) Other
5. **Marital Status:**
   1) Married 2) Unmarried 3) Separated 4) Divorced
6. **Place of Residence:**
   1) Local 2) Non-local
7. **Educational Qualification:**
   1) Illiterate 2) Primary 3) Lower Secondary 4) Secondary 5) Higher Secondary or above
8. **What is your occupation?** ……………………………………….
9. **How many times have you consumed alcohol in the past month?**
   1) Never 2) Once 3) 2–3 times 4) 4–5 times 5) Almost always 6) Daily
10. **Do you smoke?**
    1) No 2) Yes
    If yes, how many per day?
    1) 1–2 2) 3–4 3) More than 5
11. **Have you told anyone about your health condition?**
    1) Yes 2) No
12. **If yes, whom did you tell?**
    1) Spouse 2) Family 3) Health Worker 4) Other

13. **If no, why didn't you tell?** ....
14. **Have you experienced discrimination due to your HIV status?**
    1) Yes 2) No
15. **If yes, where?**
    1) Family 2) Workplace 3) Friends 4) Other
16. **Have you ever thought about discontinuing HIV treatment?**
    1) Yes 2) No
17. **If yes, why?** ....
18. **Have you received any counselling about HIV/AIDS?**
    1) Yes 2) No
19. **How do you feel about your health?**

Statement	Not Healthy	Healthy
Are you able to take medicine regularly?	☐	☐
Has the medication had a positive impact on your health?	☐	☐
Can irregular use of medicine reduce immunity?	☐	☐

20. **Have you taken medicine regularly and on time?**
    1) Yes 2) No
21. **Have you missed any doses in the past month?**
    1) Yes 2) No
22. **If yes, when was the last time you missed a dose?**
    1) 1 week ago 2) 1–2 weeks 3) 2–4 weeks 4) 1–3 months 5) More than 3 months
23. **How many times have you missed doses?**
    1) Once 2) Twice 3) Thrice 4) More than three times
    Total number of missed doses: ....
24. **If you haven't missed any doses, what helps you remember to take your medicine?**
    1) Friends 2) Family 3) Mobile 4) Alarm 5) TV 6) Other: ___________
25. **How supportive are your spouse or family in helping you take medicine?**
    1) Not supportive 2) Slightly supportive 3) Moderately 4) Very supportive
26. **Apart from ART, do you use any other treatment?**
    1) No 2) Traditional 3) Herbal 4) Other: ___________
27. **Have you missed medicine for any of the following reasons?**

S.N.	Reason	No	Yes
1	To avoid side effects	☐	☐
2	Shared medicine with spouse/family	☐	☐
3	Religious beliefs	☐	☐
4	Lack of knowledge or importance of ART	☐	☐
5	Had to go far from home	☐	☐
6	No transport to ART center	☐	☐
7	Lost or spoiled medicine	☐	☐
8	Too many medicines to take	☐	☐
9	Had a bad experience with medication	☐	☐
10	Forgot to take	☐	☐
11	Tried to avoid medicine	☐	☐
12	Too busy	☐	☐
13	Lack of food needed to take with medication	☐	☐
14	ART works well, afraid of losing financial support	☐	☐
15	Fear of being found out/discrimination	☐	☐
16	Fear of stigma/discrimination by family	☐	☐
17	Belief that ART is toxic or harmful	☐	☐
18	Confused about medicine timing or dosage	☐	☐
19	Could not go to ART center due to personal issues	☐	☐
20	Feeling hopeless	☐	☐

21	ART doesn't seem effective	☐	☐
22	Dream suggested stopping medicine	☐	☐
23	Other reason:	☐	☐

28. **Have you experienced any side effects from the medication?**
    1) Fatigue
    2) Vomiting
    3) Diarrhoea
    4) Dizziness
    5) Headache
    6) Increased anxiety
    7) Other: ________________

29. **What is your opinion about the services you receive from this center?**
    a) Do they listen to you? 1) Yes 2) No
    b) Are you allowed to ask questions or express concerns? 1) Yes 2) No
    c) Are you treated with respect? 1) Yes 2) No
    d) Do you trust the health worker? 1) Yes 2) No
    e) Is your privacy maintained? 1) Yes 2) No
    f) How do you find the environment of this centre? 1) Good 2) Bad

30. **Does your health worker give you advice about your illness?**
    1) Yes 2) No

31. **How do you travel to this treatment centre?**
    1) Walking 2) Bus 3) Personal vehicle

32. **How long does it take to get here?**
    1) 1 hour 2) 1–2 hours 3) More than 2 hours

33. **How much does one visit cost you?**
    Answer: ....

34. **Are you satisfied with the services provided by this institution?**
    1) Yes 2) No