Original Research Article

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Factors affecting adherence to antiretroviral therapy in Andhra Pradesh, India

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ABSTRACT

Background: An important factor to effectiveness of ART is good adherence to treatment. This study aims to investigate the adherence levels to ART among people living with HIV (PLHIV) attending a Government ART centre in Anakapalli, Andhra Pradesh, India.

Methods: A cross sectional study was done among 1000 adult PLHIV receiving ART. Out of nearly 4500 patients on ART we selected 1000 patients by simple random sampling technique. The average of adherence for a period of 2 years and socio demographic details were taken from the patients treatment card. Chi square test was performed to find out significant difference between the socio-demographic variables and adherence level < 95%.

Results: Out of 1000 patients, 53.9% were male. 42.2% were in age group 31 to 40 years. 50.1 % had adherence >95%. Major factors influencing poor adherence were: decrease in weight (OR=18.65, p=0.000); decrease in CD4 counts (OR=20.12, p=0.000), presence of opportunistic infections (OR=12.67, p=0.000), WHO stage 3 and 4 illness (OR=6.50, p=0.000), travel distance to ART >50 kilometres (OR=1.94, p=0.000), smoker (OR=1.82, p=0.000), being illiterate (OR=1.72, p=0.000), and alcohol consumption (OR=1.58, p=0.001).

Conclusions: Careful monitoring of weight, CD4 counts and opportunistic infections can help to identify poor adherence early.

Keywords: Adherence, ART, CD4 Counts, Literacy, Smoking, India

INTRODUCTION

The estimated number of people living with HIV (PLHIV) globally were 36.7 million at the end of 2015.

Nearly 18.2 million PLHIV were on Antiretroviral therapy (ART) by June 2016. The total number of PLHIV in India were 2.1 million at the end of 2015. Of which 44% adults were on ART in India. Undivided

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Andhra Pradesh and Telangana have the highest estimated number of PLHIV (3.95 lakhs) followed by Maharashtra (3.01 lakhs), Karnataka (1.99 lakhs), Gujarat (1.66 lakhs), Bihar (1.51 lakhs) and Uttar Pradesh (1.50 lakhs).³

As of march 2012 there were 45 ART centres and 89 link ART centres in Andhra Pradesh. Nearly 1,13,106 PLHIV were on first line ART (FLA) in Andhra as of march 2012. The adherence to ART was not much studied in PLHIV on FLA in Andhra. Hence we studied the prevalence of adherence to FLA and risk factors associated with poor adherence in PLHIV on FLA in a Government ART centre in Anakapalli, Visakhapatnam district in Andhra Pradesh.

METHODS

A cross sectional study of 1000 PLHIVs receiving FLA from Government hospital, ART Centre in Area Hospital, Anakapalli, Visakhapatnam district, Andhra Pradesh, India. The period of data collection was between September 2012 to August 2013.

Sample size

Depending upon the feasibility and availability of data we arrived at a sample size of 1000. In Anakapalli ART centre there were 8200 PLHIV registered and nearly 4500 PLHIV were on FLA. From 4500 PLHIV we selected 1000 PLHIV by simple random sampling technique and also based on the inclusion and exclusion criteria.

Inclusion criteria

Inclusion criteria were diagnosed to have HIV infection by ELISA and were on FLA; PLHA on FLA and completed 2 years of ART as of September 2012; age more than 18 years; registered and seeking care from Anakapali ART centre.

Exclusion criteria

Exclusion criteria were PLHIV who have died and stopped treatment.

Data collected

Information pertaining to patients age, sex, occupation, community, educational status, marital status, income and distance of travel from house to ART centre were collected from patients treatment card. Adherence was measured based on the monthly pill counts done by ART counselors while the patients come for monthly collection of drugs. Based on the monthly missed doses the adherence was categorized into 3 different categories.

>95% adherence: The 95% adherence means that the patients have missed less than 3 pills in a month.

80-95% adherence: If the patients have missed 3 to 12 pills in a month we categorized them under 80-95%

<80% adherence: If the patients have missed more than 12 pills in a month they were categorized to be below <80% adherence.

We computed the monthly adherence for a period of 2 years (2010 and 2011) and then finally took the average adherence for a period of 2 years. The data regarding adherence was also collected from patients ART treatment card. While doing analysis we categorized the levels of adherence into 2 categories as >95% adherence and <95% adherence and did the chi square test.

Ethical clearance

The study was approved by the Ethical committee of the Anakapalli Government district hospital and ART centre.

Statistical analysis

The data collected were entered into excel sheet and analysed using SPSS (Statistical Package for Social Sciences) version 16. The frequency tables for all collected variables were computed. In analysis we grouped the adherence levels into two categories as >95% adherence and <95% adherence. Various socio demographic factors were analyzed to find out the reason for poor adherence (<95%) using chi square test. Multivariate logistic regression analysis was also done.

RESULTS

Nearly 53.9% of the study population were males, 42.2% in the age group 31 to 40 years, 71.1% married, 57.1 were illiterate, 32% smokers and 34.7% were alcohol users. The baseline characteristics were shown in Table 1.

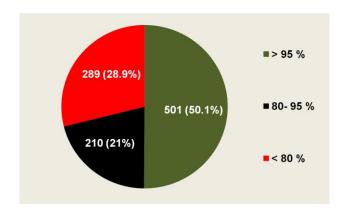


Figure 1: Percentage of adherence levels on FLA. FLA- First line antiretroviral therapy.

From Figure 1 we can see the different proportion of adherence levels to FLA. Nearly 50.1% showed adherence >95%, 21% between 80-95% and 28.9% had adherence <80%. You can see from Table 2 the different socio demographic variables and personal habits been compared against poor adherence (<95%) in multivariate analysis.

We can see from Table 2 that factors like travel distance to ART >50 kilometers, being illiterate, alcohol consumption, smoking, and diagnosed as WHO clinical staging 3 and 4 were related to poor adherence and it was both statistically significant (p=0.05) and the odds ratio was also greater than 1.

In Table 3 the clinical parameters like weight, opportunistic infections and laboratory investigation parameter like CD4 counts were compared against poor adherence. The odds ratio was very high for clinical and lab parameters. Decrease in CD4 counts (OR=20.12), decrease in weight (OR=18.62) and presence of opportunistic infections (OR=12.67) came as most significant predictors of poor adherence in multivariate analysis.

Table 1: Baseline characteristics (n=1000).

Variables	N (%)		
Gender			
Male	539 (53.9)		
Female	461 (46.1)		
Age in years			
18 to 30	351 (35.1)		
31 to 40	422 (42.2)		
41 to 50	179 (17.9)		
51 to 60	41 (4.1)		
>60	07 (0.7)		
Marital status			
Single	39 (3.9)		
Married	711 (71.1)		
Widower	14 (1.4)		
Widow	193 (19.3)		
Divorced	43 (4.3)		
Literacy status			
Literate	429 (42.9)		
Illiterate	571 (57.1)		
Personal habits			
Smokers	320 (32.0)		
Alcohol users	347 (34.7)		

N= Numbers; (%)=Percentage.

Table 2: Factors influencing adherence to ART.

Variables	Adherence <95% N (%)	Adherence >95% N (%)	Multivariate analysis odd's ratio (95% confidence interval)	P value
Age group (years)				
>40	124 (52.8)	111 (47.2)	1.162 (0.867 to 1.55)	0.352
<40	375 (49	390 (51)		
Sex				
Female	203 (44)	258 (56)	0.646 (0.503 to 0.830)	0.001*
Male	296 (54.9)	243 (45.1)		
Community				
Backward class	50 (37.3)	84 (62.7)	0.553 (0.380 to 0.804)	0.002*
Forward class	449 (51.8)	417 (48.2)		
Travel distance to ART				
>50 kms	123 (63.1)	72 (36.9)	1.94 (1.412 to 2.690)	0.000*
< 50 kms	376 (46.7)	429 (53.3)		
Literacy				
Illiterate	318 (55.7)	253 (44.3)	1.72 (1.337 to 2.218)	0.000*
Literate	181 (42.2)	248 (57.8)		
Marital status				
Others	141 (48.8)	141 (51.2)	0.93 (0.715 to 1.235)	0.705
Married	358 (50.4)	353 (49.6)		
Occupation	-			
Unskilled	430 (49.8)	433 (50.2)	0.979 (0.682 to 1.403)	0.980
Skilled	69 (50.4)	68 (49.6)		
Employment				
No	136 (43.5)	177 (56.5)	0.686 (0.524 to 0.898)	0.007*
Yes	363 (52.8)	324 (47.2)		

Continued.

Variables	Adherence <95% N (%)	Adherence >95% N (%)	Multivariate analysis odd's ratio (95% confidence interval)	P value
Monthly income				
<10000 rupees	451 (49.6)	459 (50.4)	0.860 (0.557 to 1.327)	0.567
>10000 rupees	48 (53.3)	42 (46.7)		
Safe Sex	-			
No	304 (45.2)	368 (54.8)	0.563 (0.431 to 0.736)	0.000*
Yes	195 (59.5)	133 (40.5)		
WHO clinical staging				
Stage 3 & 4	123 (83.7)	24 (16.3)	6.502 (4.114 to 10.276)	0.000*
Stage 1 & 2	376 (44.1)	477 (55.9)		
Smoking habit				
Yes	192 (60)	128 (40)	1.822 (1.391 to 2.387)	0.000*
No	307 (45.1)	373 (54.9)		
Alcohol habit				
Yes	199 (57.3)	148 (42.7)	1.582 (1.217 to 2.057)	0.001*
No	300 (45.9)	353 (54.1)		

N= Numbers; (%): Percentage;*: Significant p-value <0.05.

Table 3: Clinical and biochemical parameters influencing adherence.

Variables	Adherence <95% N (%)	Adherence >95% N (%)	Multivariate analysis OR (95% Confidence Interval)	P value
Weight categories				
Decreasing	352 (86.1)	57 (13.9)	18.65(13.326 to 26.109)	0.000*
Increasing	147 (24.9)	444 (75.1)		
CD4 count category				
Decreasing	385 (84.2)	72 (15.8)		
Increasing	114 (21)	429 (79)	20.12(14.53 to 27.86)	0.000*
Opportunistic infections		-		
Yes	178 (89.4)	21 (10.6)	12.67(7.89 to 20.35)	0.000*
No	321 (40.1)	480 (59.9)		

N= Numbers; (%): Percentage; *: Significant p value<0.05; OR=odds ratio.

DISCUSSION

Our study showed nearly 49.9% had poor adherence. A systematic review and meta-analysis study done by Mhaskar et al on adherence to ART in India showed the pooled adherence rate was only 70%.⁵ Mhaskar et al study also reflected our study findings of ART adherence levels were below the required levels to have an optimal treatment effect.⁵

We compared the adherence levels to ART with other studies done in India (Table 4).

Two studies done by Rai et al and Hansana et al showed adherence levels <95% as 43% and 40%, which was almost comparable with our studies poor adherence level of 49.9%.^{6,7} On the contrary a study done by Anuradha et al found very low levels of poor adherence equivalent to only 3.2%. While other studies found poor adherence levels of 36.3% and 27%.⁸⁻¹⁰ The wide differences to poor adherence levels to ART of around 3% to 50% from

previous studies may be attributed to difference in sample size, study settings, the methods used to measure adherence levels and also the time duration for adherence measurements.

Table 4: Comparison of adherence levels to ART from previous studies.

Previous studies	Sample size	Adherence >95%	Adherence <95%
Rai et al ⁶	239	57	43
Hansana et al ⁷	346	60	40
Anuradha et al ⁸	250	96.8	3.2
Achappa et al ⁹	116	63.7	36.3
Shah et al ¹⁰	279	73	27
Present study	1000	50.1	49.9

Our study showed the most important predictors of poor adherence was decrease in CD4 counts, decrease in weight and presence of opportunistic infections. Even certain other studies showed a relationship between adherence and CD4 counts. 11-13 A study done by Ross-Degnan et al showed that the patients with <80% coverage gained significantly less weight than those who were more adherent. 14 A study done by Fonsah et al reported similar findings to our study in terms of opportunistic infections and adherence. 15

CONCLUSION

Even though our study showed factors like travel distance to ART, being illiterate, smoking, and alcohol consumption, had significant relation to poor adherence. The odds of developing poor adherence was very high among clinical parameters like current opportunistic infection, decrease in weight and WHO clinical staging and lab parameter like CD4 counts on multivariate logistic regression analysis.

Recommendations

Patients on long term ART with current opportunistic infections, decrease in CD4 counts, decrease in weight and WHO clinical staging 3 and 4 should be suspected for poor adherence and followed up. Counseling related to cessation of smoking and stopping of alcohol consumption to be more emphasized in counseling sessions. The travel distance to ART can be minimized by directing the patients to receive ART from their nearby centres.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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