

# Compliance of Anti-Retroviral Therapy among 250 HIV Infected Persons in a Tertiary Level Hospital in India

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**Abstract:** **Background:** AIDS is a disease which in the present era has gained utmost importance owing to both its prevalence and also fatality. This study aims at determining the compliance of therapy and the clinical profile used as an aid to draw conclusions for various reasons of non compliance. **Aim and objective:** To determining the compliance level of HIV patients undergoing Anti-Retro Viral Therapy and reasons for non-compliance. **Materials and Methods:** A detailed structured Questionnaire was prepared to analyse the compliance of 250 patients receiving ART from the ART centre of a tertiary level hospital.. The data collected are analyzed using Chi-square test, Student t test and the proportion tests. **Results :** Out of 250 patients 74% patients showed 100% compliance level( $p < 0.001$ ). In males 73.82% were 100% compliant and in females 74.25% were 100% compliant. 69.59% employed were compliant and 91.13% unemployed were compliant.. 71.73% illiterate were compliant, The family income per month  $\leq 1000$  are 100% compliant;  $\leq 5000$  - 71.51% were compliant;  $\geq 5000$  -72.41% were compliant. Patients who had travelled a distance of only  $\leq 10$  kms were 87.35% compliant; a distance of 11-50 kms of which 72.38% were compliant , a distance of  $> 50$  kms 41.37% were compliant. **Conclusion:** The results of our study revealed that a compliance of 74%(185/250) which was affected by a number of socio-economic and physical reasons. The compliance can be increased by repeated counselling to both the patient and the family members and to high risk groups.

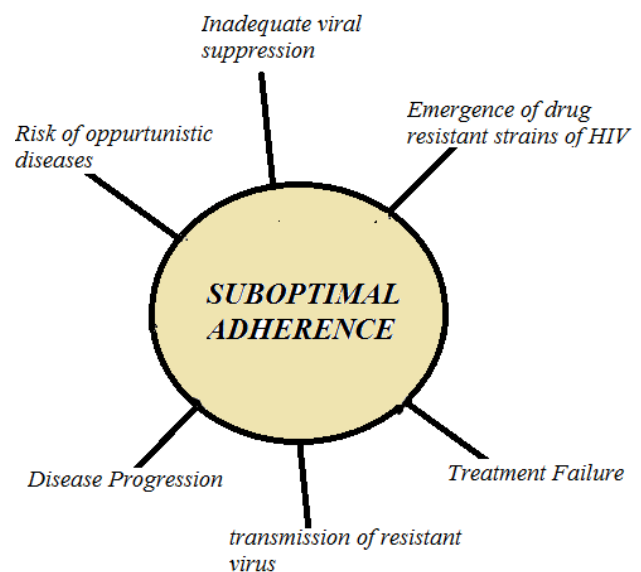
**Keywords:** Antiretroviral therapy, Compliance, Psycho-social factors, Adherence to Antiretroviral therapy

## 1. Introduction

India has 2.1 million people living with HIV, the third largest population of people infected with HIV/AIDS according to UNAIDS Gap report 2014. (23.9 lakh people as per the 2008-2009)<sup>1</sup>. Advances in Anti retroviral therapy (ART) and HAART (Highly Active Anti Retroviral Therapy) over the last 15 years have led to dramatic changes in the prognosis, quality of life and management of people living with HIV and AIDS in both resource rich and resource limited environment. The main drugs given are Nucleoside Reverse Transcriptase Inhibitors (NRTIS)- Zidovudine, Lamivudine, Stavudine etc, and Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI'S) -Nevirapine and Efavirenz. Combinations of these provide with different regimens for ART.

ART is useful in prolonging and improving the quality of life and postponing the complications of AIDS or AIDS related complex (ARC), Since none of the regimen can eradicate HIV from the body of the patient, the goal of the therapy is to inhibit the viral replication.

A study conducted by Dr. Ajay K Sethi et al<sup>3</sup>, concluded that poorer compliance is associated with treatment failure, but not necessarily resistance. Thus a very high compliance level is required for the success of the treatment.



This study focuses on determining the compliance of patients receiving Anti-Retroviral Therapy in a tertiary level hospital in India and various reasons for the lower compliance.

## 2. Aims and Objectives

This study aims at determining the compliance level of HIV patients undergoing Anti-Retro Viral Therapy and evaluate various reasons for non-compliance calculated.

### 3. Materials and Methods

- **Study design:** Observational Randomized questionnaire study.
- **Type of study:** Prospective study.
- **Site of study:** Outpatient Department, ART centre, Government Rajaji Medical College Hospital, Madurai, Tamilnadu.
- **Duration of study:** 2 months.
- **Sample size:** 250 subjects.

#### Methodology

A prospective study of about 250 patients receiving ART from the ART centre of a tertiary level hospital is to be conducted and their compliance to therapy is evaluated. The patients are selected intermittently but consecutively during the morning office hours.

#### Inclusion Criteria

- 1) The patient should be receiving the medication for atleast a period of 1 year.
- 2) Patient should be 18 years or older.
- 3) Patients of both sexes are evaluated.
- 4) Patients receiving only two regimens A and B are selected.

#### Regimen A

Tab. Stavudine 300mg  
 Tab. Lamivudine 150mg  
 Tab. Nevirapine 200mg

#### Regimen B

Tab. Zidovudine 300mg  
 Tab. Lamivudine 150mg  
 Tab. Nevirapine 200mg

#### Exclusion Criteria:

- 1) Patients are excluded from the study if they have an active illness or unaware of their HIV infection status.
- 2) Pregnant ladies are exempted.

#### Confidentiality

Personal information's like contact address or telephone numbers are not collected and confidentiality maintained. Informed consent form is given to all patients that states all the essential details related to the study. They are asked to read the informed consent before the start of study and get sign from them.

#### Ethical Considerations

As the study includes human participants, a clearance from the Institutional ethics committee (IEC) is obtained.

#### Procedure

The selected patients are interviewed personally using a questionnaire which deals with the personal history of the patient and also his status in receiving antiretroviral therapy. The patient history includes the basic details of the patient along with details like family size, income, marital status, substance use etc. The later part of the questionnaire focuses on the various aspects of Antiretroviral therapy. Details of drug regimen, food, frequency of drug intake and visit to the

ART center, difficulties in continuing therapy, social support, alternative therapies, counselling, health care satisfactions etc are analyzed.

Compliance is calculated by directly asking the patient whether they have taken the medications regularly at proper time and intervals for the past 1 month, on the advice of doctor. Percentage of adherence is calculated on the basis of above compliance. Similarly follow up adherence is calculated for past 1 year and since HIV infection was detected. Low compliance are calculated as those who are having adherence level of less than 100%. i.e. missing even a single dose can render a patient non-compliant. The major factors which contribute to low compliance are finally enquired and correlated with their personal and clinical history.

#### Statistical Analysis

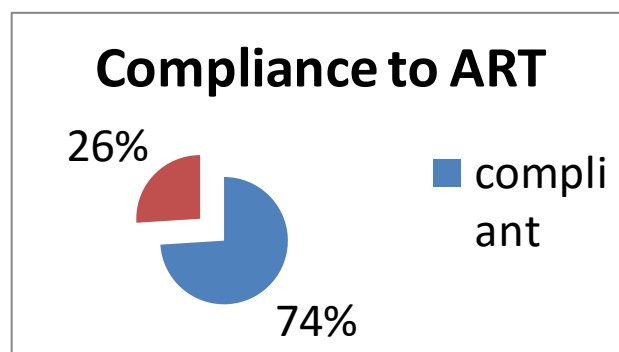
The data collected are analyzed using Chi-square test, Student t test and the proportion tests.

### 4. Observations and Results

250 HIV positive patients on Antiretroviral therapy (ART) have agreed to give consent for analysis of adherence to ART. They were interviewed using a questionnaire at ART centre. Out of 250 patients, 185 (74%) patients showed 100% compliance level ( $p < 0.001$ ). Remaining 26% were not 100% compliant. (Table 1, Figure 1)

**Table 1:**

Total	Compliant	Non-Compliant
250	185(74%)	65(26%)



**Figure 1**

Out of 250 patients 149 (59.6%) were males and 101 (40.4%) were females. In males 110 (73.82%) were 100% compliant and in females 75 (74.25%) were 100% compliant. Compliance is equal in both gender. The data had no significance on statistical analysis. (Table 2)

**Table 2**

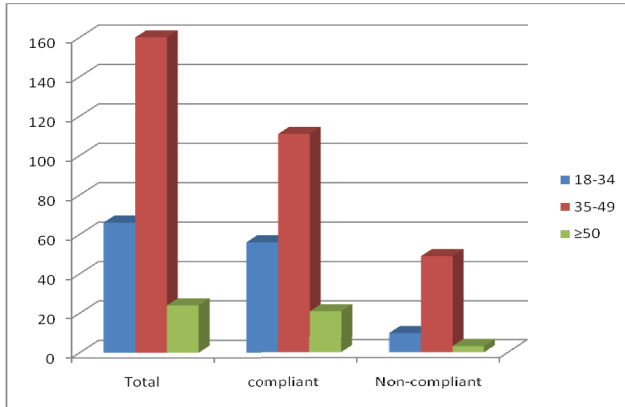
	Total	Compliant	Non-Compliant
Male	149(59.6%)	110(73.82%)	39(26.17%)
Female	101(40.4%)	75(74.25%)	26(25.74%)

66 (26.4%) patients belonged to 18-34 age group, and out of these 56 (84.84%) were found to be compliant. 160 (64%) belonged to 35-49 age group in which 111 (69.37%) were found to be compliant. 24 (9.6%) belonged to  $\geq 50$  age group

which reported 87.5%(21 subjects) compliance. compliance was more in older age group.(Table3,Figure 2)

**Table 3**

Age group	Total	Compliant	Non-Compliant
18-34	66(26.4%)	56(84.84%)	10(15.16%)
35-49	160(64%)	111(69.37%)	49(30.63%)
≥50	24(9.6%)	21(87.5%)	3(12.5%)



**Figure 2**

Of the 250 patients, 171(68.4%) were employed of which 119(69.59%) were compliant and 79 were unemployed of which 72(91.13%) were compliant. Compliance has no relation to employment status. The data had no significance on statistical analysis.( $p \geq 0.01$ )

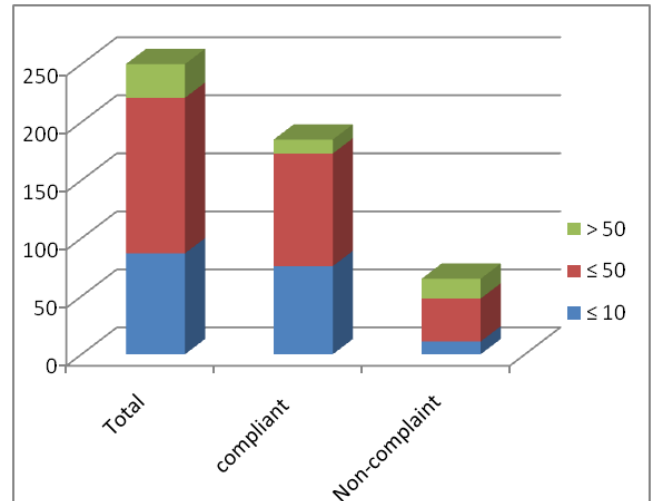
46(18.4%) subjects were illiterate of which 33(71.73%) were compliant, 63(25.2%) had primary education of which 54(85.71%) were compliant, 132 had secondary education of which 93(70.45%) were compliant and 9(3.6%) had studied beyond XII of which 5(55.55%) were compliant. The data had no significance on statistical analysis.( $p \geq 0.01$ ) .

The family income per month was  $\leq 1000$  for 20(8%) subjects,all(100%) being compliant; $\leq 5000$  for 172(68.8%) of which 123(71.51%)were compliant; $\geq 5000$  for 58(23.2%) of which 42(72.41%) were compliant. The economical status had no significant role in compliance ( $p \geq 0.01$ ).

87(34.8%) patients had to travel a distance of only  $\leq 10$  kms of which 76(87.35%) were compliant;134(53.6%), a distance of 11-50 kms of which 97(72.38%) were compliant and 29 had to travel a distance of  $> 50$ kms out of which only 12(41.37%) were compliant. (Table 4,Figure 3). A significant association was noted between compliance and the distance from the ART centre( $p \leq 0.001$ )

**Table 4**

Distance from ART center	Total	Compliant	Non-Compliant
$\leq 10$ kms	87(34.8%)	76(87.35%)	11(12.64%)
11-50kms	34(53.6%)	97(72.38%)	37(27.61%)
$> 50$ kms	29(11.6%)	12(41.37%)	17(58.62%)
	$P < 0.001$		



**Figure 3**

Of the 250 patients 16(6.4%) were single,7(2.8%) were divorced or separated,67(26.8%) were widowed and 160(64%) were married, out of which 12(75%), 5(71.42%), 45(67.16%) and 123(76.87%) were compliant respectively. (Table 5) marital status had no significant role in compliance ( $p \geq 0.01$ ).

**Table 5**

Marital status	Total	Compliant	Non-Compliant
Single	16(6.4%)	12(75%)	4(25%)
Divorced	7(2.8%)	5(71.42%)	2(28.57%)
Widowed	67(26.8%)	45(67.16%)	22(32.83%)
Married	160(64%)	123(76.87%)	37(23.12%)

Of the 250 patients,234(93.6%) had  $\leq 4$  members in their family and 175(74.78%) of them were compliant.16(6.4%) had 5-8 members in their family and of these 10(62.5%) were compliant. The data had no significance on statistical analysis.( $p \geq 0.01$ )

231(92.4%) subjects reported support from family and friends out of which 176 (76.19%)were compliant .Only 9(47.36%) out of 19(7.6%) who reported there was no support was compliant to the therapy(Table 6,Figure 4).Significant association was noted between compliance and support the subjects get from the family and friends.( $p < 0.01$ )

**Table 6**

	Support from family / friends	Compliant	Non-Compliant
	Total		
Yes	231(92.4%)	176(76.19%)	55(23.80%)
No	19(7.6%)	9(47.36%)	10(52.63%)
	$P < 0.01$		

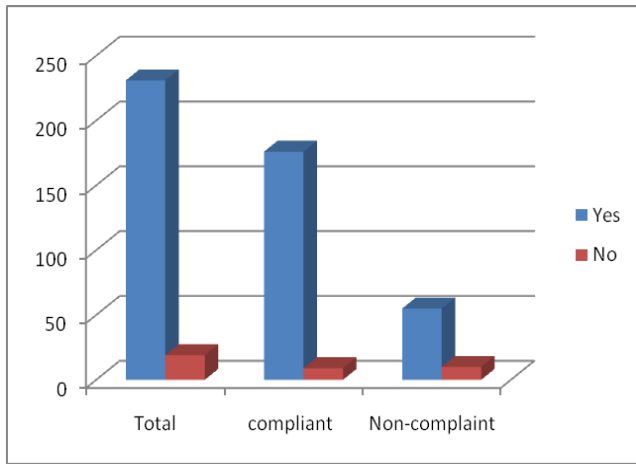


Figure 4

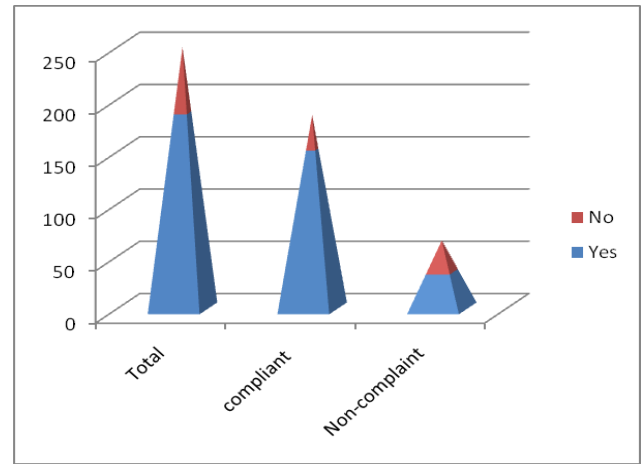


Figure 6

48(19.2%) subjects had yet another member in the family affected and receiving ART. 42(87.5%) were compliant in this group. Out of the rest 202(80.8%), compliance of only 143(70.79%) is reported (Table 7, Figure 5). compliance is better when another family member received ART ( $p < 0.01$ ).

Table 7: Any other family member on ART?

	Total	Compliant	Non-Compliant
Yes	48(19.2%)	42(87.5%)	6(12.5%)
No	202(80.8%)	143(70.7%)	59(29.21%)
		$P < 0.01$	

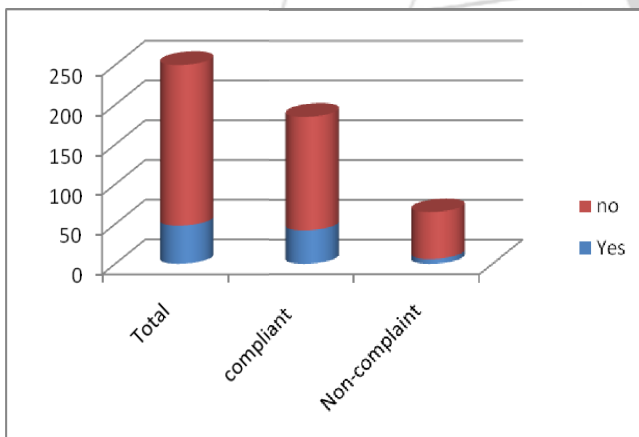


Figure 5

Reminders from family members were there for 187(74.8%) subjects of which 152 (81.28%) were compliant. Out of the 63(25.2%) those who had no reminders only 33(52.38%) were compliant (Table 8, Figure 6). Reminders had improved the adherence rate ( $p < 0.001$ ).

Table 8:

Reminders from family	Total	Compliant	Non-Compliant
Yes	187(74.8%)	152(81.28%)	35(18.71%)
No	63(25.2%)	33(52.38%)	30(47.61%)
		$P < 0.001$	

Of the 226(90.4%) subjects who were satisfied with counselling, 179(79.20%) were compliant and of the 24(9.6%) who were not satisfied with the counselling 18(75%) were noncompliant and only 6(25%) were compliant (Table 9, Figure 7). Counselling had significant positive impact on compliance ( $p < 0.001$ ).

Table 8

Reminders from family	Total	Compliant	Non-Compliant
Yes	187(74.8%)	152(81.28%)	35(18.71%)
No	63(25.2%)	33(52.38%)	30(47.61%)
		$P < 0.001$	

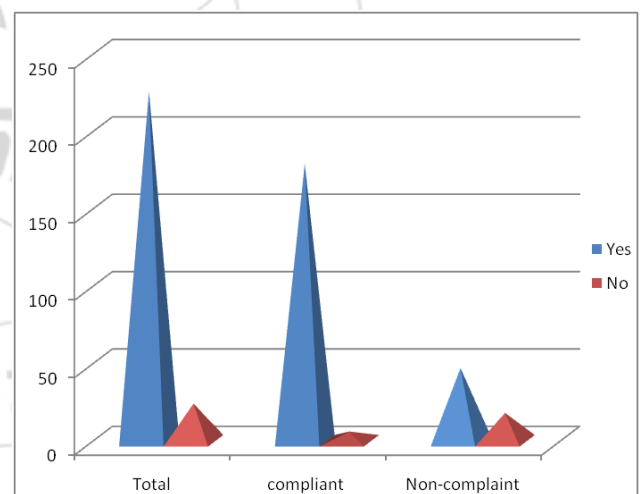


Figure 7: Counselling Satisfaction

Of the 58(23.2%) patients who has been on ART for <2years, 27(46.55%) have been found to be compliant. 154(61.6%) patients were on ART for a period of 2-5 years of which 124(80.51%) were found compliant. Of the 38(15.2%) who were on ART for >5years, 34(89.47%) were compliant (Table 10, Figure 8). compliance rate was high when patients were on ART for a long time ( $P < 0.001$ ).

Table 10

	Total	Compliant	Non-Compliant
< 2	58(23.2%)	27(46.55%)	31(53.44%)
2 - 5	154(61.6%)	124(80.51%)	30(19.48%)
> 5	38(15.2%)	34(89.47%)	4(10.52%)
	$P < 0.001$		

Year since ART initiation:

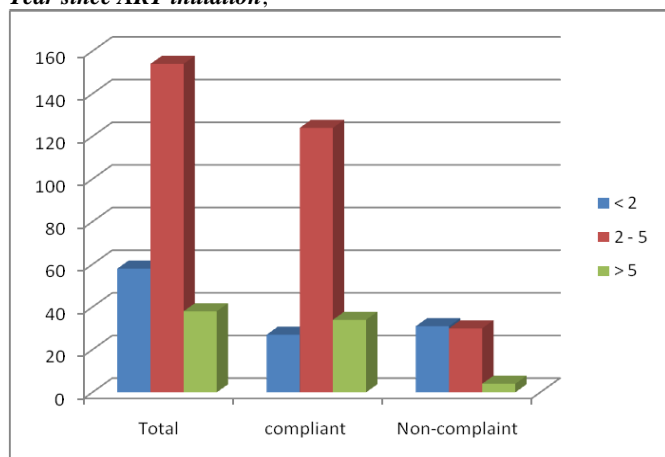


Figure 8

123(49.2%) patients received Regimen A (Stavudine + Lamivudine + Nevirapine) and 111(90.24%) out of it were compliant. Of the 127(50.8%) who received the Regimen B (Zidovudine + Lamivudine + Nevirapine), only 74 (58.26%) were compliant (Table 11, Figure 9). More compliance was noted in patients receiving Regimen A ( $p < 0.001$ )

Table 11

Regimen	Total	Compliant	Non-Compliant
A	123(49.2%)	111(90.24%)	12(19.76%)
B	127(50.8%)	74(58.26%)	53(41.73%)

$p < 0.001$

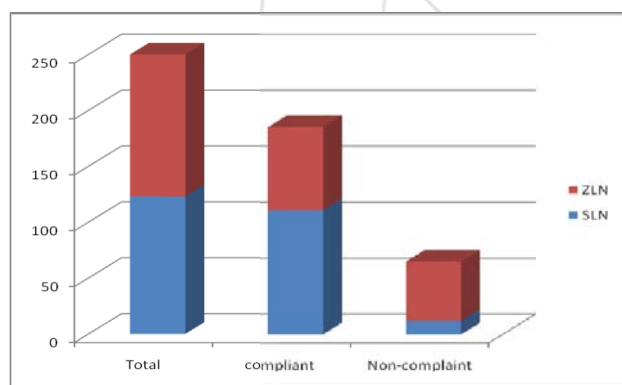


Figure 9

It has been observed that of the 192(76.8%) patients who were regular in follow up visits, 183(95.31%) were compliant. Only 2(3.44%) out of 58(23.2%) patients who were not regular in follow up were compliant (Table 12, Figure 10). Patients with regular follow up were more compliant ( $p < 0.001$ ).

Table 11

Regular follow up	Total	Compliant	Non-Compliant
Yes	192(76.8%)	183(95.31%)	9(4.68%)
No	58(23.2%)	2(3.44%)	56(96.55%)
		$P < 0.001$	

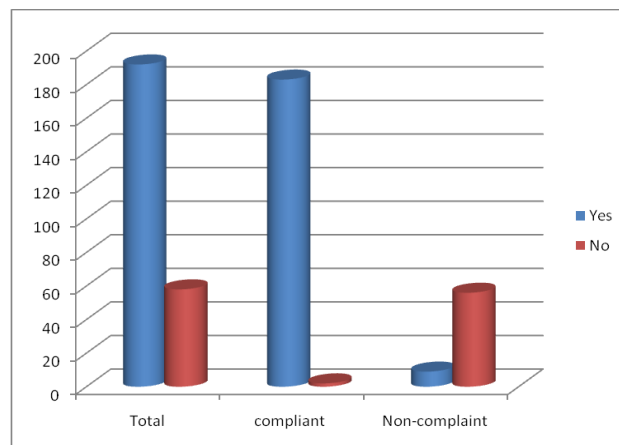


Figure 10: Regular follow up

Of the 54(21.6%) who have acquired Tuberculosis after the initiation of ART, 26(48.14%) were compliant and 28(51.85%) were noncompliant. Of the 250, 7(2.8%) patients have sought Alternative health care but even then 6(85.71%) of them reported being compliant.

## 5. Discussion

250 HIV patients on ART who had agreed to give consent were interviewed using a questionnaire and their compliance level to the therapy was analysed. The compliance level of 74% obtained through the study is in concurrence with a study conducted on private clinics in Mumbai (13), where 73% adherence was reported. Compliance level is comparatively less than a study conducted in Brazil (6) where 89.3% self reported 100% compliance. Compliance level is comparable to a study conducted in Bangalore, India (9) where only 60.4% compliance was reported.

The younger and older age groups were more compliant than the middle aged ones. The middle age groups after becoming healthy due to the therapy become over confident and start giving less importance to the therapy without knowing the future complications. This is also supported by a study conducted in Canada (11).

.. The subjects who came from nearby places were found more compliant than the subjects from farther places. If any other member of the family is affected by HIV and is receiving ART, there is a greater chance for the patient to become adherent (87.5%). Chi-square test has shown significant association for the above statement. Support from the family members and their knowledge about the disease had a significant association (76.19%). As expected, smoking, alcohol, use of illicit drugs etc affected compliance to a great extent. This relation is also shown in the study conducted by Gutierrez et al in Brazil (6).

The subjects receiving Regimen B were less compliant as compared to the patients on Regimen A. It had been proved to have greater side effects. The side effects reported by the patients included nausea, vomiting, dry tongue, sleeplessness, dizziness, allergic reactions, joint pain, weight loss, skin lesions, stomach burn, anorexia, tortuous vein, renal stones, blisters in tongue, itching, diarrhoea, muscle pain, dyspnoea, anemia, loss of vision, numbness etc. The

majority of the patients said that these were more common during the initial years of starting of the drug. This was also found to have a significant association with the compliance of the patients. In this study also, patients on ART for less than 2 years were less compliant.

Similarly when the patient has been receiving the ART for a longer time their compliance is more. This is in conflict to the study from Bangalore(9) where no such trends were observed. The reason for high compliance in patients who has been on ART for a longer time(89.47% ->5years) is that they get adapted to the drug and the side effects would have become unnoticed.

The patients who were attending the follow up dates regularly were found more compliant. Counselling satisfaction is found to be yet another important determining factor for compliance.

In contrast to the expectations, educational status, employment status, family size, marital status and economic status were not found to be determining factors for compliance. The other reasons that were pointed out were forgetfulness, going to far off places for work, poverty etc. An important thing to be noted here is that only a negligible percentage of patients reported side effects of the drug as a reason for non compliance.

## 6. Conclusion

The study revealed that compliance is affected by a number of socio-economic as well as physical reasons. Many demographic factors were found significantly associated with the compliance. The study revealed that age, distance travelled from the ART centre, family support, other family members in ART, reminders, counselling, ART duration, regular follow up, side effects, regimen etc had direct effect on determining the compliance of the patient.

The compliance can be increased by Repeated counselling easily accessibility and regimens with less side effects. Proper identification of factors responsible can help in improving the present treatment facility given to the patient so that the compliance can be improved significantly. The study involved interaction with HIV patients which helped in understanding the various aspects of their living conditions the attitude of the patients towards the therapy and the various complications and the after effects of the therapy can be elicited. Detailed study on the reasons for low compliance can help in determining various measures to alleviate them.

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