



Study of Adherence for Haart and Its Correlation with Immunological Status

KEYWORDS

haart, adherence, cd4 count, immunological improvement

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ABSTRACT *Back ground: Adherence rate of atleast 95% is required for optimum viral suppression and the prevention of viral mutation of drug resistant HIV strains , measured by CD4 cell and viral load counts*

Objective: To study the relation between adherence for HAART and the immunological improvement

Materials and methods: This is a quantitative, retrospective univariate analytical study done in PLHIV and who were on HAART during the period of January 2008 to December 2013. The data is analysed using windows excel sheets and SPSS and univariate analysis was done for adherence rate and CD4 cell count.

Result : 2593 patients ranged from 18-60 years the average age was 38 years. There were more males(1535/59.2%) than females(1040/40.2%) and transgenders(18/0.06%). Out of 2593, 83% had reported adherence level of >95% and 82% of them achieved immunological recovery(cd4 >350) (p < 0.01). This shows the strong positive relation between the adherence rates and the immunological recovery in our setting.

Conclusion: In a developing country like India focus on adherence rates >95% for HAART improves the immunological status of the patients and decrease in the mortality rates are observed

Background:

The introduction of HAART has greatly improved the survival of HIV/AIDS infected people. HAART reduces morbidity and mortality by suppression of viral replication, restoration and preservation of immune function, and prevention of drug resistance¹⁻⁴. Mortality among patients on HAART is associated with high baseline levels of HIV RNA⁵; WHO stage III or IV at the beginning of treatment, low body mass index; severe anaemia; low CD4 cell count^{1,6}; type of ART treatment; cotrimoxazole prophylaxis⁷; gender^{8,9}; resource-poor settings and poor adherence to HAART

Adherence to HAART is critical to the survival of HIV/AIDS infected people. Non-adherence to HAART is a major public health concern because it leads to virologic, immunologic and clinical failure, and increases the risk of transmission of drug resistant virus. The major causes of non-adherence to HAART are forgetfulness, lack of understanding of treatment benefits, severity of adverse events, and the level of complexity of the drug regimen. Given this complexity, the effect of adherence to HAART on survival has been reported mainly in clinical trials or other controlled environments^{1,3}.

Methods

The study was carried out in RIMS medical college. HIV/AIDS patients are identified through voluntary counselling and testing, and registered at ART centre if found to be HIV positive.

The criteria for HAART entry are: a CD4 cell count below 350 cells/mm³; WHO stage 3 or 4 disease; There are routine clinic visits after enrolment when HAART drugs

are dispensed and adherence assessed: at four weeks; six months; and thereafter at twelve months. The distribution of follow-ups depends on the patient's performance in terms of improvement and adherence exhibited.

Pill count adherence is monitored by asking patients to retain any missed doses in their pill boxes, and they are checked in their next visit. Adherence is assessed as pill count which is the number of pills actually taken as a percentage of the number of pills dispensed. Self-reported adherence measurement technique is used by asking the patients the number of times they have missed taking their pills. The adherence levels from the two measures are compared. The higher level is recorded as the patient's adherence level for that assessment and the lower level, if less or equal to 95%, forms the basis for the patient's follow up for adherence support through adherence counselling.

All HIV/AIDS patients, who were aged at least 18 years, initiated antiretroviral treatment in the period from January 2008 to December 2013, and whose records were readily available, were included in this analysis. The mean adherence to HAART for each eligible record was computed and the records were divided into two categories: adherent (average adherence greater than 95%) and non-adherent (\leq 95% adherence). Death was confirmed from death notification. Analysis was based on all-cause mortality.

Results

A total of 2593 patients were studied and their adherence were reviewed. Out of the 2593 patients studied, 700 (17%)

patients had a mean adherence of 95% or less, and 2152 (83%) patients had overall mean adherence of greater than 95% (Table 1)

Table 1 showing the distribution of patients among adherent and non adherent category

Category	No of patients	Percentage
Adherent	2152	83%
Non adherent	441	17%

The majority of the patients were males (1535/59.2%), when compared to the counter females (1040/40.2%) and trans-genders (18/0.06)(Table 2). The mean age at initiation of HAART was 38 years. The majority of the patients (78%) studied were initiated on HAART with a baseline CD4 count of 350 cells/mm³ or less.

Table 2 : sex distribution in the sample study

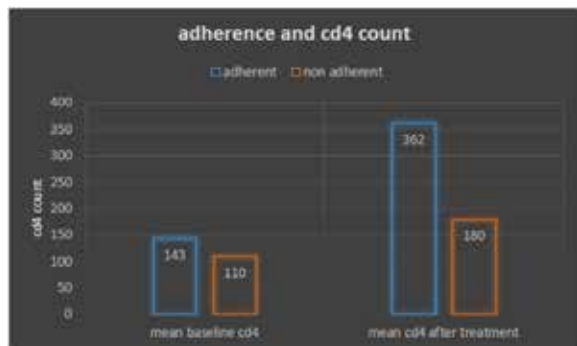
Sex	No. of patients	Percentage
Males	1535	59.2%
Females	1040	40.2%
Transgenders	18	0.06%

During the study period, 158 patients (6%) died. For the non-adherent patients, 48(10.8%) deaths were reported, for adherent patients 110(5.1%) deaths were reported. The patients lost to follow up were 297 (11.45%).

In all, there were 2593 patients who started therapy with baseline CD4 count of <350 cells and with opportunistic infections. Of this, 2153(83%) and 441(17%) were adherents and non-adherents respectively

The immune responses of two categories (both of which had baseline CD4 count <350cells) were compared. Adherence was monitored using self-reports from patients. The mean pre-therapy CD4 count for non-adherent patients was 110 cells which was slightly lower than adherent patients (143 cells) as shown in figure1. After 12 months of treatment, CD4 count had increased to 362 (p<0.01) and 180 cells (p=0.21) for adherents and non-adherents respectively.

Figure 1: shows cd4 count before and after treatment



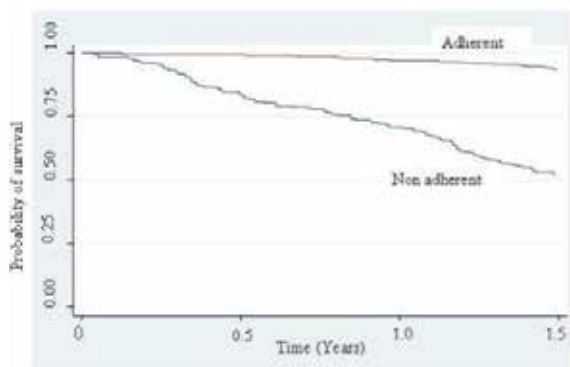
Discussion and Conclusion

Our study showed that the majority of the patients

had good adherence to HAART with 83% of the patients achieving a mean adherence of greater than 95%. Comparison of adherence to HAART between studies is fraught with many obstacles including differences in study population and design, definition and measurement of adherence, as well as differences in sample size and type of HAART. Nevertheless, the adherence rate in our study was similar to that reported in previous studies in sub-Saharan Africa.

In our study, there were difficulties in ascertaining the cause of death. The cause of death was determined in the form of verbal autopsy which classifies deaths in broad categories but does not permit assignment of a specific cause of death¹¹. Thus there were limitations in determining the underlying cause of death and we therefore performed all-cause mortality analysis. The use of all-cause mortality in our study may have led to an under or overestimation of the overall mortality among HAART patients. Finally, under or overestimation of mortality could have occurred because a significant proportion (11.4%) of the participants on HAART were lost to follow up. Nevertheless, the overall mortality in our study was similar to that reported in previous studies¹⁰.

Non-adherent participants had a mortality of 10.8%, higher than that of adherent participants. These findings are consistent with other studies that have reported that non-adherence is associated with increased mortality. Non-adherence to HAART leads to virologic, immunologic and clinical failure that is mediated mainly by two potentially re-enforcing mechanisms. Non-adherence to HAART leads to failure to suppress viral replication, thus increasing the likelihood of developing HIV mutations that could lead to the development of drug-resistant viral strains. Secondly, non-adherence to HAART fails to prevent further viral destruction of the cellular immune system with consequent reduction in the level of CD4+ cells and development of opportunistic infections. It is worth noting that mortality among adherent participants in our study 5.1% was comparable to mortality rates reported in developed world settings.



The above figure shows the probability of survival in adherent and non adherent groups using Kaplan meier survival curves.

The principal limitation of our study was the study design. The study was a retrospective cohort, and therefore we did not control for all the potential confounders that could confound the association between non-adherence to antiretroviral therapy and patients' survival, such as viral load and opportunistic infections

at initiation of HAART. Viral loads were not recorded, this situation may have resulted in an under or over estimate of the association between non adherence and survival.

The measurement and definition of adherence to antiretroviral therapy may have introduced bias. There is no gold standard for measuring adherence to antiretroviral therapy. The approaches employed in this study included patient self-report and pill counts. The self-report obtains a patient's subjective evaluation of his or her own level of treatment compliance behaviour. The advantages of the self-report method include its simplicity, speed, and viability of use. The disadvantages include reliance on recall and social desirability bias, with a tendency to overestimate ad-

herence. Nevertheless, several studies highlight the usefulness of the self-report as an adherence measurement tool and show it to correlate well to virologic outcome. Adherence measurement depended on a clinician's subjective judgment. Also using mean adherence over the period a patient was on treatment could have introduced measurement bias into our study.

In conclusion, our study showed that good adherence to HAART and improved survival are feasible in community HIV/AIDS treatment. In a developing country like India focus on adherence rates >95% for HAART improves the immunological status of the patients and decrease in the mortality rates are observed.

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