Adherence to Antiretroviral Therapy, and Quality of Life in People Living with HIV: A Prospective Study

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Combination antiretroviral therapy (ART) is the cornerstone of management of patients with HIV, and a strict adherence to the same is of utmost importance in success of therapy. Treatment in most cases, once started has to be taken life-long, and hence compliance can be an issue. With newer once-a-day regimens, there could be a positive impact on both the adherence to the treatment and the quality of life (QOL); assessing these various factors was the purpose of this study. This observational longitudinal study was conducted at a teaching hospital offering tertiary care in Coastal Karnataka, and the study population consisted of 198 patients with HIV of both genders, on ART. All patients aged over 18 years, who were HIV positive and on ART from at least one month were included. Data was collected by directly interviewing the patient through the questionnaire at the ART clinic. A total of 198 patients were interviewed, and assessed for adherence to ART using the Medication Adherence Questionnaire (MAQ), a validated questionnaire. The quality of life was assessed using the WHOQOL questionnaire, again a validated and elaborate questionnaire. Of the total patients, 103 were males. According to MAQ scale, a medium to high level of adherence was observed in 97.5% of the patients (score 0 is high adherence, score of 1 or 2 is medium adherence). Regarding the QOL, 43% of them responded to having good energy levels and being able to perform their daily activities without difficulty, over 80% of them said they were able to work normally, and able to carry out their duties, along with being satisfied with their capacity to work. The adherence to antiretroviral therapy was observed to be >95% in majority of the patients when assessed using the Medication Adherence Questionnaire, which is very good. The quality of life was deemed to be satisfactory when assessed using the WHOQOL questionnaire.

Keywords: Antiretroviral Therapy; HIV; Medication Adherence; Quality of Life.

Combination antiretroviral therapy (cART) is the cornerstone of management of patients who have been infected with Human Immunodeficiency Virus (HIV). With a lot of research and funding, highly effective antiretroviral drugs are currently combined and prescribed, thus bringing about significant disease control.[1,2]

Antiretroviral therapy (ART) regimen is a multi-drug regimen of three drugs often consisting of two NRTIs (nucleoside reverse transcriptase inhibitor) and one NNRTI (non- nucleoside reverse transcriptase inhibitor) in a fixed dose combination. Each of these drugs have their own specific dosage and side effects. For the patient to get a positive

response to treatment, a good adherence to the regimen is of vital importance.[3,4,5] According to a study, the percentage of patient with viral load less than 400 copies per millilitre fall below 60% when adherence to the regimen is less than 95%. Once the therapy fails, drugs in the regimen are unable to inactivate the virus, hence cannot be used for future therapy, thereby limiting the choice of drugs available. The preferred regimen for first line failure include a protease inhibitor (PI) based therapy which involves inclusion of ritonavir in low doses to increase the bioavailability to the primary protease inhibitor.[6]

Many of the anti-retroviral drugs are known to cause several adverse effects. These adverse effects can range from being mild to even life threatening; and can in turn affect the compliance of the therapy as well.[7] With strict adherence to the therapy, PLHIV can have a near-normal life expectancy, but their quality of life (QoL) is low compared to the general population even when the viral load is under control.[8,9]

Studies conducted in the past regarding these situations, suggest that social circumstances, relationship issues, comorbidities and stigma affect the QoL of PLHIV in addition to the underlying disease.[10,11] Observations from earlier studies also include a pressing need to promote income generating activities among people infected with HIV, in order to empower themselves.[12,13]

With newer once a day regimens, there could be a positive impact on both the adherence levels to therapy and the quality of life; assessing these factors is the purpose of conducting this project.

MATERIALS AND METHODS

The study was conducted at a teaching hospital in Coastal Karnataka catering to a wide area of the region with varied patient characteristics; the participants comprised of HIV positive subjects of both genders on antiretroviral therapy. This was an observational longitudinal study, spanning over a period of eight months (March 2018 to October 2018). The sample size was assessed to be 198, based on an earlier study which showed 70% adherence to treatment, using the formula $4pq/d^2$.[13]

All patients aged over 18 years, who were already diagnosed to be HIV positive and on ART from at least one month were included. Severely ill patients, patients on anti-tubercular treatment / other conditions that could independently affect the quality of life and adherence to therapy were excluded.

Data was collected by directly interviewing the patient through the questionnaire at the ART clinic. All details regarding HIV infection was collected. Antiretroviral treatment details collected included the type of regimen, date started, switch-over to other regimens. The questionnaire used for the study was based on the Medication Adherence Questionnaire to assess the adherence,[14,15] and for the quality of life, the WHO- Quality of Life HIV questionnaire was used.[16] The translated and validated version of the questionnaire in the local language was used for the study.

The Medication Adherence Questionnaire has been one of the most popular scales to assess adherence to medication, and has been earlier used in patients on ART containing a protease inhibitor. It is short and easy to use, and helps to identify factors that act as barriers to adherence. The adherence is classified as being low, medium, or high. Also, a pictorial scale was added to assess the adherence. An adherence of more than 95% was considered high adherence.[14,17]

The WHO- Quality of Life HIV questionnaire has been designed to identify various factors that affect a patient's overall health status. Questions asked included aspects relating to patient's sense of well-being, sleep, memory, opportunities, daily routine activities, ability to work, thoughts about the future, pain status, and any symptoms related to HIV, etc. The questions asked specifically assess the patients' health and wellbeing over the past two weeks.

The collected data was analysed using SPSS, version 16. A p-value <0.05 was considered statistically significant. The study was begun only after obtaining due permission from the "institutional ethics committee (IEC)". Patients were included in the study once they were explained in detail about the same and if they agreed to provide a written informed consent. The individuals in the study sample were identified by a code, and no personal information was recorded. Any personal identifiers were not included.

RESULTS

A total of 198 patients were interviewed, and were assessed for adherence to ART along with the quality of life using the "WHOQOL" questionnaire.

Of the total patients, 103 were male patients and the rest were female. Majority of the patients interviewed were married (81.2%), while 14.2% were single; the rest were either widowed/ divorced/ separated. The average age of the participants was 45 ± 9.6 years (Mean ± SD). The average CD 4 count was 466 ± 276.2 cells/mm3 (Mean ± SD); the average duration of illness was 5 ± 4.34 years (Mean ± SD). The largest percentage of patients had received an education up to primary school level (57.1%), while about 14% of the patients had gone to University. Among the participants, 50.3% of them had been HIV positive for a duration of 1 – 5 years, 29.7% had tested positive 5 - 10 years back, and 12.6% of them have had the disease for more than 10 years.

A large majority of the patients, when asked in general about how they felt their health was, said it was neither bad nor good; less than 1% gave a positive reply of their health being very good. However, at the same time, none of the patients said they considered themselves 'ill'. Of the total patients included, majority of the patients (87.5%) had WHO stage I disease, 1.1% of patients had stage II disease, 6.2 % had stage III disease, and 5.6% patients had stage IV disease.

The standard regimen of treatment according to the NACO guidelines included three drugs, the most common regimen being a combination of tenofovir, lamivudine, efavirenz (39.89%), followed by the next combination of zidovudine, lamivudine, nevirapine (25.75%). The other combinations included tenofovir + lamivudine + nevirapine, tenofovir and lamivudine along with a protease inhibitor such as atazanavir + ritonavir. The adherence was assessed using the Medication Adherence Questionnaire (MAQ) scale described earlier. According to this scale, a *medium* to *high* level of adherence was observed in 97.5% of the patients (score 0 = high adherence, score of 1 or 2 = medium adherence). When the patients were asked to assess the percentage of medicines taken in the last month using a pictorial scale, about 95% of the patients said they took the medicines '*most*' of the time. The remaining patients who did not take the pills on time when asked about the reason

Table 1. Outline of the WHO- Quality of life questionnaire [16]

Section	Questions	Response range
1	How much a patient has experienced certain things in the last two weeks, such as happiness	Not at all (1), A little (2), A moderate amount (3), Very much (4), An extreme amount (5)
2	How completely the patient was able to do certain things in the last two weeks, such as activities related to daily living	Not at all (1), A little (2), Moderately (3), Mostly (4), Completely (5)
3	How satisfied, happy or good the patient felt about various aspects of life over the last two weeks, such as family life	Very dissatisfied (1), Dissatisfied (2), Neither satisfied nor dissatisfied (3), Satisfied (4), Very satisfied (5)
4	How often the patient has felt or experienced certain things, such as family support, or negative experiences such as feeling unsafe	Never (1), Seldom (2), Quite often (3), Very often (4), Always (5)
5	Questions refering to any "work" that the patient does, such as studying, house work, childcare, etc.	Not at all (1), A little (2), Moderately (3), Mostly (4), Completely (5)
6	How well the patient was able to move around	Very poor (1), Poor (2), Neither poor nor good (3), Good (4), Very good (5)
7	Questions concerned with the patients' personal beliefs (religion/ spirituality)	Not at all (1), A little (2), A moderate amount (3), Very much (4), An extreme amount (5)
8	Importance questions (how important various aspects of life are to the patient)	Not important (1), A little important (2), Moderately important (3), Very important (4), Extremely important (5)

for the same, the most common response was that they forgot to take the medication routinely.

The quality of life was assessed using the WHOQOL questionnaire. The first section of the questionnaire assessed if the patients had experienced emotions such as positive feelings, happiness or contentment, over the past two weeks. Majority of the patients reported little to moderate discomfort/ pain, were not tired easily, and had no sleep disturbance (Score 2). Also, the patients' ability to concentrate as well as the confidence in themselves was positive in majority of the patients. However, more than 50% of the patients responded as having moderate level of financial difficulties (Score 3).

The second section looked at the patients' ability to do certain specific things such as activities of daily life in the last two weeks- of the total patients' interviewed, 43% of them responded to having good energy levels and being able to perform their daily activities without difficulty (scores 4 or 5). However, about 60% of the patients felt that the support received from others and the acceptance was moderate to little (Score 3 or below).

The next section assessed the patient's ability to do the work that they did for a living. A very positive trend was observed; over 80% of the patients responded to being able to work normally, and being able to carry out their duties, along with being satisfied with their capacity to work (scores 4 or 5). The fourth section focussed on how satisfied, happy or good the patients felt about various aspects of their life over the last two

Table 2. Baseline Characteristics of the Patients

Gender	103 M, 95 F				
Age (years)No. of patients	<30 years	31 – 40 years	41 – 50 years	51 – 60 years	>60 years
	15	45	87	43	8
Duration of illness (years)	< 5 years	5 – 10 years	> 10 years		
	112	62	21		

Table 3. Medication Adherence Questionnaire

Question	Number of patients with response "No" (No=0)	Number of patients with response "Yes" (Yes=1)
Do you sometimes forget to take your pills?	192	6
Over the past two weeks did you skip taking your pills, for reasons other than forgetting?	195	3
Have you anytime stopped taking your pills without telling your doctor, because you felt worse when you took the pills?	196	2
When you travel or leave home, do you forget to carry your medication with you?	197	1
Did you take you pills yesterday?	189	9
When you feel your health is under control and you're feeling okay, do you stop taking the medication?	198	0
Do you ever feel fed up of taking medication every day?	189	9
How often do you have difficulty in remembering to take all your medication?(Please circle the correct number)		
Never/Rarely (0) ………………………………………………	194	
Once in a while (1)……………………………………………..	04	
Sometimes (2)……………………………………......……………..…	00	
Usually (3)……………………………………….…..……………..	00	
All the time (4)…………………………….……..........................	00	

weeks. Overall, majority of the patients felt they were satisfied with their capacity to work, energy, ability to perform daily activities, access to health facilities, support from immediate family/ friends, and the quality of life (score 4 or 5).

The next section revolved around the patients' beliefs, and how these beliefs affected their quality of life. Over 65% of the patients felt little to moderately guilty about being HIV positive, and were scared of what the future holds (score 3). About 25% of them responded saying that their personal beliefs played a very important role in helping them to face various difficulties. The last section dealt with "importance" questions- meaning how important various aspects of life were to the patients. Over 70% patients responded by saying their quality of life, health, a pain-free and energetic life, with a good quality of sleep, was extremely important to them (score 5).

DISCUSSION

We began this study with the aim of assessing the adherence to antiretroviral therapy in patients with HIV, and assessing the quality of life while taking the medications. Of the 198 patients included, 103 were male patients, and the gender distribution was not significantly different. The baseline characteristics did not significantly vary between genders. According to a study conducted in India, the quality of life in women was worse than men infected with HIV.[13] In our study too, a similar trend was observed though not statistically significant. This may be attributable to various socio-cultural nuances present in the society, across various communities and cultures.

The adherence to treatment was observed to be more than 95% in majority of the patients. This is an important observation that plays a major part in determining the response to therapy and the success of antiretroviral therapy. An earlier study conducted to study the adherence to treatment, concluded that patient education and counselling, including alcohol abstinence, could contribute to increasing the adherence to treatment as well as success of ART among people living with HIV.[18] The Medication Adherence Questionnaire was initially designed to assess the adherence to antihypertensive medications in 1986. It was shown to have a good predictive validity, and subsequently

it was used in diabetes, psychoses, osteoporosis, asthma, HIV, among others. The psychometric properties of this scale help to determine the factors affecting adherence.[14,19]

A study conducted in Myanmar reported an adherence of >95%, in 84% of the study population; the main reason for not being regular with the medication was being busy or not being at home, or forgetting to take the medication.[20] Another study conducted on South Africa found that 77% of the study population had an adherence of >95%, which was considered suboptimal.[21] In another study conducted in Lao PDR, an adherence of more than 95% was seen only in 60% of the patients.[22] An earlier study had suggested that the MAQ had a component to look at the psychological factors associated with taking medication, along with the patients' behaviour. Both these components play a vital role in success of any medications prescribed to the patients.[23] An adherence of >95% was observed in our study in majority of the patients. An earlier study in the same settings had reported a suboptimal adherence, and had suggested an intensive adherence counselling.[24]

For the success of antiretroviral therapy, measured in terms of CD4 count and viral load, along with quality of life, the single most factor that can affect the success of therapy is the patients' adherence to treatment. Skipping doses leads to resistance and may even result in failure of first line regimen. Hence, this observation from our study is a positive and encouraging trend. This observation also suggests that the tolerability to adverse effects among patients has improved and that the patients are motivated enough to not stop the medications by themselves if side effects do happen. This is achieved with personal, professional counselling at the ART clinic before initiating the treatment, and regular follow up to check for the adherence thereafter.

Coming to the second aspect of our study, the quality of life in patients living with HIV. An earlier study to assess the QOL, in patients with HIV had concluded that good family support and access to healthcare were important factors that contributed to QOL.[13,25] Another study that used the WHOQOL instrument found that overall, all the domains pertaining to various aspects of life fell into the category of "moderate", with a focus

on the patients' spirituality being more than their social relationship.[26]

However, all the factors under various domains were perceived to be "satisfactory" by majority of the patients in our study, which is again a good sign of our healthcare settings. Anxiety and depression which are major factors in PLHIV that can affect the QOL adversely, were observed to be "little to moderate" in our study.[27,28]

The quality of life is a factor that is as important as the clinical success of therapy. An improvement in the quality of life and being able to lead a life as close to what is considered "normal" as possible, is finally what matters the most from the patient's point of view. Hence, when we measure the success of antiretroviral therapy, along with the laboratory parameters, the quality of life has to be assessed. The observations from our study are a good sign indeed as to how over the years, with the availability of better-tolerated and more effective drugs, the patients are largely able to lead a "normal" life, along with being able to do all activities of daily living. Also, being able to indulge in work and leisure, helps patients to integrate with the society at large and this gives a huge mental boost to the patients as well.

Our study did have certain limitations, the main being that it was a single centre study. Hence the results may not be generalizable in all populations. Plus the region caters to a population where the literacy levels are higher. Also, we relied mainly on the information obtained from patients, and recall bias *may* not have been fully eliminated. Another issue that we faced is the questionnaire being a long one, we could not get some patients to complete it fully. Hence a final score to interpret the questionnaire was not obtainable, which otherwise would have added more relevance to the data.

Ensuring good health for one and all is one of the sustainable developmental goals (SDG) of the United Nations; such research that studies diseases of public health importance, will help in utilizing the available resources in the best possible way so as to try and ensure quality life for all citizens.[29]

CONCLUSION

The adherence to antiretroviral therapy was observed to be >95% in majority of the patients when assessed using the Medication Adherence Questionnaire. The quality of life was deemed "satisfactory" when assessed using the WHOQOL questionnaire. However, further studies which follow-up the patients for a longer period, are warranted to be able to better understand the factors that affect the quality of life and adherence to treatment in patients living with HIV.

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