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Impact of education on medication adherence behavior of HIV/AIDS Patients

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ABSTRACT

A prospective study was conducted to evaluate medication adherence behavior in HIV/AIDS patients on antiretroviral therapy. Brief Medication Questionnaire (BMQ), a screening tool to assess medication adherence behavior and barriers to adherence was administered on study population at base line and final follow up of the study period. The study population received education regarding their disease, medications and importance of adherence to medication at each follow-up. The study patients with negative BMQ screen scores were considered as adherent to the antiretroviral medications. Influence of patient education was assessed by comparing the pre and post educational BMQ scores. Higher mean regimen, belief, recall, and medication access screen scores at the baseline suggested the non-adherent behavior of the study population. At final follow up, a significant decrease ($p<0.01$) in the regimen, belief, access and total screen scores of BMQ suggested the improvement in adherence behavior. Our study also observed a significant increase ($p<0.01$) in the number of patients, shifting from positive screen to negative screen scores of BMQ. The results of our study suggested the need for continuous patient education in HIV/AIDS patients to improve the adherence behavior and effectiveness of their medications to achieve desired therapeutic out comes. Pharmacist provided education sessions were found to be effective in improving medication adherence behavior of HIV/AIDS patients.

Key Words: Medication Adherence, BMQ, Patient Education, pharmacist.

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) is the state of profound immunosuppression produced by chronic infection with Human Immunodeficiency Virus. [1] Untreated HIV infection was a leading cause for the increased morbidity and mortality rate. However the introduction of Highly Active Antiretroviral Therapy (HAART) has transformed HIV infection from a fatal to a chronic manageable disease by decreasing the viral load, increasing the CD4 cell count, preventing the opportunistic infections and death. [2]

HAART is a lifelong treatment option containing potent antiretroviral combinations requiring patients to take as twice daily or thrice daily depending upon the stage of infection with suitable diet restrictions and necessary life style modifications. Due to severe adverse effect profile of the HAART, often patients fail to adhere to their medication. [3]

Poor adherence to HAART has been identified as an important factor associated with therapeutic failure; possible drug resistance and the risk associated with non-adherence ranging from individual to societal level. [4]

Like other chronic diseases, adherence to antiretroviral medications is also a major issue in HIV management. Successful treatment of HIV/AIDS with HAART requires that patients maintain nearly perfect adherence to the prescribed regimen. Recent studies have shown that >95% adherence is necessary to achieve therapeutic success (an undetectable virus load).[3] However studies have concluded that the level of 100% adherence can produce even greater benefits than adherence level below that and for every 10% decrease in adherence there is a 16% increase in HIV related mortality rate. [5][6] Studies carried out in diverse culture and geographical settings have found that the average rate of nonadherence with antiretroviral therapy was from 50% to 70%. [8]

Few studies on adherence behavior have observed that interventional strategies have enhanced the medication adherence behavior in HIV/AIDS patients. Although no single strategy was proven to be helpful in improving the adherence, however educational intervention has shown a positive response.[8] Studies have also shown pharmacist's educator role in analyzing barriers in adherence and strategies to overcome them in HIV-infected patients by providing patient counseling. [8][9][10]

As per the UNAIDS/WHO estimates, India is now in 2nd position having more number of HIV cases. This increase in number of HIV cases in India reflects its diverse social, cultural, religious, and sexual practices. [11]As per the latest statistics in India about 2.5 million people are suffering from AIDS and require HAART. Though the government of India is providing free ART at identified Government tertiary care hospitals, adherence to the prescribed medication still remains as a challenge. [12]The main reason for non-adherence is lack of knowledge and understanding about the disease process and its treatment. Providing disease and medication related information at the individual level is one of the motivational strategies that may improve the adherence behavior. [13][14]

Studies pertaining to medication adherence behavior in AIDS/HIV patients in India are scarcely available. This study was initiated to analyze the impact of pharmacist provided education on medication adherence behavior.

MATERIALS AND METHODS

This was a prospective study conducted over a period of nine months in a South Indian Non Governmental Organization (NGO) center for AIDS Care and Research. Inclusion criteria were applied to enroll HIV infected patients aged more than 18 years of both the gender who were on antiretroviral therapy and ready to sign the consent form. Institutional Research and Ethics Committee approved the study.

A validated Brief Medication Questionnaire (BMQ), [15] an instrument to assess reported medication adherence behavior was administered at baseline and at the final follow-up on all the study patients.

BMQ consists of a five-item regimen screen, that asks the patients about their medications that they were currently taking, Questions are asked to list the name of each medication, frequency of medication per day, number of days and times they have received each medication along with number of times the patient missed taking medications in the past week. The belief screen of BMQ consists of two questions that ask the patients whether they had any difficulty with any of the medications, and does the medication bother them in any way. The two-item recall screen assesses the patient's difficulty in recalling and remembering the dosage regimen of their medications. While, 2- item access screen of BMQ evaluates the patient difficulty in buying and refilling their medications in time.

A score of > 01 is a positive screen, which represents that patient has reported some non-adherence regarding their medication regimen. A score of zero designates a negative screen that indicates patients' adherence to their medication. Higher the BMQ screen score, higher the reported rate of nonadherence to medications.

Patients' demographic details, past medical and medication history was obtained in a suitably designed case report form and baseline BMQ was administered. The study patients received structured patient education from the pharmacist about their disease, diet, medications and importance of adherence to medications. Both verbal counseling and patient information leaflets on HAART were provided to the patients. At final follow-up BMQ questionnaire was re-administered to the patients to assess the impact of patient education on adherence behavior in HIV/ADS patients.

The post educational BMQ score was compared with the pre educational BMQ score to evaluate the influence of education. The statistical analysis of the data was carried out by using SPSS, version 11 (Statistical Package for the Social Sciences). The Chi-square test, paired' test and Pearson correlation were used.

RESULTS AND DISCUSSION

A total of 104 patients meeting the study criteria were enrolled into the study. Out of which 90 patients (86%) completed all the follow-ups. Fourteen patients were considered as dropouts due to irregular follow ups. Only the data of those patients who completed all the follow-ups were included for analysis.

The gender distribution of the study population shows that 58 male and 32 female patients with an average age of 32 years participated in this study. More than 35 % of the study patients were illiterates (n=32) and 51% of the study subjects were from rural area. The average annual income of 42 % of the study population was found to be less than 50,000 per year. The demographic details of the study patients are summarized in Table I.

Among the enrolled patients, 44 patients were receiving antiretroviral medications free of cost from an identified government ART center. Treatment aspects of the study population are shown in Table II.

Table I: Demographic characteristics of the study patients

Variables	No. of patients (n=90) n (%)
Sex	
Male	58 (64.4%)
Female	32 (35.5%)
Age (In Years)	
20-25	3 (3.3 %)
26-30	18 (20 %)
31-35	18 (20 %)
36-40	22 (24.4%)
41-45	5 (5.5%)
46-50	5 (5.5%)
51-55	8 (8.8%)
56-60	10 (11.1%)
61-65	1 (1.11%)
Education Level	
Illiterate	32 (35.5%)
Primary	16 (17.7%)
Secondary	21 (23.3%)
Pre university	11 (12.2%)
Degree	10 (11.1%)
Annual Family Income (In Rupees)	
<5,0000	38 (42.2%)
50,000 to 100,000	31 (34.4%)
>100,000	21 (23.3%)
Employment Status	
Employed	62 (68.8%)
Unemployed	28 (31.1%)
Social habit	
Smoker	37 (41.1%)
Alcoholic	10 (11.1%)
Residential Area	
Rural	46 (51.1%)
Urban and semi urban	44 (48.8%)

Table III: Comparisons of base line and final follow-up BMQ score

COMPARISON OF POST EDUCATION BMQ WITH PRE EDUCATION BMQ SCORES					
BMQ Screen	**Number of study patients (n)**	**Baseline Mean ± SD Scores**	**Final follow-up Mean ± SD Scores**	**Frequency**	**P Value**
Regimen Screen	**90**	**2.34 ± 1.36**	**0.54 ± 0.72**	**36.9**	**p<0.01**
Belief Screen	**90**	**1.35± 0.73**	**0.44±0.56**	**11.1**	**p<0.01**
Recall Screen	**90**	**1.51± 0.64**	**0.55±0.62**	**0.03**	**p=0.853**
Access Screen	**90**	**1.07± 0.86**	**0.33±0.49**	**41.0**	**p<0.01**

p<0.05 is considered as statistically significant

The mean BMQ screen scores at the baseline suggest that the patients were non adherent to their medications. A significant decrease (p<0.01) in the regimen, belief, access and total screen scores was observed at the final follow-up, and a non significant decrease in the recall screen scores was observed. The results of medication adherence are presented in table III and influence of education on medication adherence behavior is presented in Table IV.

Table II: Medical illness related variables of the study patients

Variables	No. of patients (n=90) n (%)
HIV infection acquired through	
Sexual intercourse	69 (76.6%)
Blood transfusion	20 (22.2%)
Others	1 (1.11%)
HIV status	
Asymptomatic	36 (40%)
Symptomatic	35 (38.8%)
AIDS	19 (21.1%)
Disease duration in years	
< 1	7(7.77%)
1 to 4	66(73.3%)
5 to 9	15(16.6%)
10 to 15	2(2.22%)
Duration of Antiretroviral drugs	
< 1 years	37(41.1%)
1 to 4 years	50(55.5%)
5 to 9 years	2(2.2%)
Antiretroviral drugs	
Zidovudine+Lamivudine+Nevirapine	2(2.2%)
Lamivudie+Stavudine+Nevirapine	62(68.8%)
Lamivudine+zidovudine+Efavirenz	26(28.8%)
Number of medications	
3	41(45.5%)
4	13 (14.4%)
5	10 (11.1%)
7	4 (4.4%)
8	18 (20%)
14	4 (4.4%)
Accessibility of Antiretroviral agents	
Through ART center	
Others	44 (48.8%)
O	46 (51.1%)

Table IV: Influence of education on shift of patients from positive screen to negative screen

BMQ Screen	Follow-up (N=90)	No. of patients in negative Screen	Chi-square	P Value
Regimen Screen	**Base line**	**2**	**46.2**	**P<0.01**
	Final follow-up	**52**		
Belief Screen	**Base line**	**14**	**22.7**	**P<0.01**
	Final follow-up	**53**		
Recall Screen	**Base line**	**7**	**31.5**	**P<0.01**
	Final follow-up	**49**		
Access Screen	**Base line**	**30**	**10.5**	**P<0.01**
	Final follow-up	**61**		

p<0.05 is considered as statistically significant

Table V: Pearson correlation of continues variables with BMQ

Continues variables	Pearson correlation Sig (2- tailed) N	ART REGIMEN SCREEN	ART BELIEF SCREEN	ART RECALL SCREEN	ART ACCESS SCREEN
Age	Pearson correlation Sig (2- tailed) N	-0.16 0.879 90	0.015 0.892 90	0.054 0.613 90	-103 0.332 90
Education	Pearson correlation Sig (2- tailed) N	** -0.557 0.000 90	* -0.261 0.013 90	** -0.548 0.000 90	0.197 0.063 90
Income	Pearson correlation Sig (2- tailed) N	* -0.209 0.048 90	-0.095 0.372 90	-0.162 0.127 90	0.038 0.721 90
Comorbidity	Pearson correlation Sig (2- tailed) N	0.143 0.179 90	0.049 0.646 90	0.137 0.198 90	-0.036 0.735 90
Disease duration	Pearson correlation Sig (2- tailed) N	** -0.162 0.127 90	0.127 0.232 90	** -0.066 0.535 90	0.071 0.509 90

***Correlation is significant at the 0.01 level (2-tailed): *Correlation is significant at the 0.05 level (2-tailed)*

Our study also found a negative association with education, income and disease duration in regimen screen scores of BMQ. A negative association was also found between education and disease duration with recall screen scores of BMQ and a negative association was also observed between education and belief screen scores of BMQ. Pearson correlation of continuous variables with BMQ scores are presented in Table V.

A total of 104 patients were enrolled into the study. Out of which 90 patients completed all the follow-ups. Fourteen patients were considered as dropouts. Reasons for the dropouts can be attributed to fear of disclosure of their serostatus, absence of symptoms, financial problems and transportation problems.

We choose to measure the medication adherence pattern by patient self reporting method using Brief Medication Questionnaire (BMQ). At baseline the mean BMQ screen scores for all the four screens of the questionnaire were found to be higher, which suggested that patients were non-adherent to their medications. Study patients reported lowest scores in access screen when compared with other screens. As antiretroviral medications were easily accessible to the study subjects in government tertiary hospitals at free of cost may be the reason for low scores in access screen.

Scores of regimen screen was documented highest at baseline indicating higher self-reported non-adherence to medications. This might be due to lack of knowledge in HIV/AIDS patients regarding the name, dose, indication, and efficacy of their medications. Several other studies have concluded that lack of knowledge about the medications like the name, dose, frequency and indications is an important reason for non-adherence. [16]

At final follow-up, a significant ($p<0.01$) reduction in the regimen, belief, and access BMQ screen scores of the study patients was observed. This reduction in the BMQ screen scores indicates improvement in the self-reported adherence status of the study patients after receiving pharmacist provided education sessions. Several studies conducted have also found the same result that educational and motivational strategies can improve adherence. [17]

There was a decrease in mean BMQ recall screen scores from baseline to final follow up, but this reduction in scores were not found to be statistically significant. This data of our study indicates the difficulty in recalling and remembering the exact dosage regimen of their medications might be due to higher number of prescribed medications, presence of co-morbidities and also the presence of chronic diseases can affect the cognition of the patient. [18]

Though free ART medications were available in government tertiary care hospitals, some patients preferred to pay from their pockets with the fear of social stigmatization. A study has reported that access to ART does not guarantee adherence. [19]

After the education sessions there was a decrease in the proportion of patients reporting trouble in remembering to take their medications and this increased the number of patients in negative screen of BMQ, showing a higher reported adherence. These findings suggest that educating the patients about their disease and its management will help to improve the adherence behavior. This finding is supported by several studies and documented the role of pharmacist in improving the patient's medication knowledge, adherence and improved therapeutic outcomes. [20][21]

In our study, a negative association was found between income, education and duration of treatment with antiretroviral therapy and BMQ regimen screen scores. These patients were unable to mention the name, dose, frequency, and indications of their medication. We also found that education and duration of treatment with ART were also negatively associated with BMQ recall screen scores which indicated the patients' difficulty in recalling the exact dosage regimen of their medications.
Patients who were on ART for a lesser duration of time were also finding difficult to recall their medications. Several studies identified the reasons associated with decreased adherence as low level of income, poor educational status and lesser duration of treatment with antiretroviral therapy. [22]Data of the present study suggest that poor knowledge about their disease and treatment was a main reason for low level of non-adherence. [23]Improvement in the scores of various regimens at the final follow up suggested that, education has shown positive influence on the adherence behavior.

CONCLUSION

The results our study suggest that there is a need for continuous patient education in HIV/AIDS patients regarding the effectiveness of their medications and the need for adherence to the medication regimen. Pharmacist provided education sessions were found to be effective in improving medication adherence behavior of HIV/AIDS patients.

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