Clinical research

Assessment of factors contributing to adherence to antiretroviral therapy among people living with HIV: our experiences from a local missionary hospital in southeastern Nigeria

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Abstract

Introduction: Acquired immune deficiency syndrome (AIDS) has ceased to be dreadful, and is now considered a manageable chronic disease since the introduction of antiretroviral therapy (ART). Its goal is to achieve maximal and long-lasting suppression of viral replication. A high level of adherence is essential for effective ART, and there are many factors contributing to adherence in patients on ART. The objective of our study was to determine the level of adherence and factors influencing adherence to ART among people living with HIV.
Material and methods: The study was conducted in the ART center at Bishop Shanahan Hospital from November to December 2017. Patients attending the ART center were included in the study. A cross-sectional study was conducted among HIV-positive patients using a well-structured questionnaire. The data collected were analyzed using SPSS version 16.0. Binary logistic regression was performed to identify associations between factors and adherence.
Results: Although the predictors were non-significant (i.e. $p > 0.05$), age, gender, taking alcohol and herbal medicine, and having no medication reminder were found to be predictors of non-adherence in our study. Major reasons for missing pills were forgetfulness due to being busy (71.4%), giving up hope (26.2%) and lack of food (21.4%).
Conclusions: Adherence to antiretroviral treatment in the ART center was sub-optimal. Patients on ART should be counseled adequately and appropriately before initiating antiretroviral treatment. Patient education must be enforced at all levels of care.

Key words: HIV, Nigeria, adherence, antiretroviral, barriers.

Introduction

Antiretroviral therapy (ART) has significantly impacted the quality of life of human immunodeficiency virus (HIV) patients globally. Coun-

tries where ARV is readily available have seen a substantial reduction in HIV-related morbidity and mortality [1]; hence, unlike before, acquired immune deficiency syndrome (AIDS) is currently a chronic disease with a manageable approach. However, to attain a considerable outcome or avoid suboptimal results from the use of ART, high levels of compliance and adherence to ART in patients are ultimately required.

The WHO defined adherence as a patient's ability to follow a treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medications [2]. Adherence to medications is a significant problem in any chronic disease management, and improper adherence to ART may also lead to a failed regimen.

Regardless of the benefits, the introduction of highly active antiretroviral therapy (HAART) for treating HIV disease has progressively led to a complex drug regimen [3]; and with respect to adherence, these multi-regimens give rise to challenges to both patients and healthcare providers. It is important for antiretroviral agents to be maintained at appropriate levels of concentrations to lower the plasma viral load. In addition, poor adherence can present and accelerate drug-resistant complications in patients on ART. Therefore, for successful and prolonged viral load suppression, high adherence amongst patients on ART is paramount.

Factors such as age, financial burden, cognitive status (forgetfulness), substance abuse, lack of supportive care, and distance of ART center from patients have been identified as barriers to ART adherence in previous studies [4–6]. It is crucial to identify specific barriers that lead to sub-optimal adherence to ART in different localities and develop specific strategies tailored at improving and maintaining long-term adherence in ART patients. This study was designed with the objectives of identifying the level of ART adherence and factors contributing to adherence among ART patients at a local missionary hospital in southeastern Nigeria.

Material and methods

Study population and setting

The study was conducted at the antiretroviral therapy (ART) center in the Out-patient Department (OPD) of Bishop Shanahan Hospital (BSH), located in Nsukka Local Government Area in Enugu state, Nigeria, between October and December 2017. BSH is the largest missionary hospital run by the Catholic Diocese of Nsukka, providing clinical and healthcare services to over ten thousand people living in the area.

Study design and inclusion criteria

A cross-sectional study was carried out among patients on ART. Participants were selected by a simple random sampling technique from the list of attendance. Both male and female adult patients (aged 18 years and above) on first line antiretroviral treatment were included in the study after obtaining their consent according to the Nigerian National Ethics and operational guidelines for research on human subjects. Eligibility included ART patients who visited the ART center at BSH and gave consent for participation in the study.

Data collection

The study tool for interview was a carefully self-designed, structured questionnaire aimed at meeting the criteria and purpose of the study. It contained closed-ended questions. The validity of the questionnaire was ascertained by conducting a pilot study using 20 patients. Cronbach's α was 0.78, which shows a good internal consistency and thus was used for the entire survey. The data were collected between November and December 2017. During the study period of 2 months, HIV-positive patients on ART who visited the ART center OPD at the BSH, satisfied the inclusion criteria, and gave informed consent for participation were interviewed by well-trained research assistants. The pretested questionnaire consisted of the socio-demographic characteristics of the patients, duration of ART use, presence of supportive care (if they had a care-giver), and whether they paid for ART.

Measurement of adherence

Adherence was assessed using the Morisky Medication Adherence Scale (MMAS-4). The use of the MMAS test tends to measure adherent behavior (dependent on the person's decision to take medication, access to medications, and ability to initiate treatment and maintain a medication-taking pattern) rather than dose adherence [7, 8]. The MMAS was chosen and used for this study over the commonly used Adult AIDS Clinical Trials Group (AACTG) scale because studies have suggested the superiority of the MMAS due to lesser internal attrition [7], and less complexity [8]. The four-question Morisky Medication Adherence Scale (MMAS-4) with scores ranging from 0 to 4 was used to measure levels of adherence in ART patients [9]. Scores < 0.95 indicate high adherence to medication [10]. In addition, respondents were interviewed on possible reasons for non-adherence.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethics Committee of Bishop Shanahan

Hospital, Nsukka. The study was also subjected to institutional ethics review and clearance was obtained from the University of Nigeria, Nsukka after careful consideration.

Statistical analysis

The collected data were coded into Microsoft Excel and analyzed using SPSS v. 16. Categorical variables were expressed as frequency (percentage) and continuous variables as mean ± SD. Logistic regression analysis was conducted to identify the predictors of adherence. Statistical significance was considered at a value of $p < 0.05$.

Results

Respondents' socio-demographic data

A total of 110 patients were identified and included in the study. The mean age was 39.7 ±11.3 years. The majority (40.9%, $n = 45$) of the study population were in the age group of more than 40 years. About three-quarters of the respondents were female (75.5%, $n = 83$). The majority (78.2%, $n = 86$) of the patients were married (Table I).

Respondents' adherence

The mean adherence score of the study population using the MMAS-4 score was 0.95 with a range of 0 to 4. High adherence (having a summary score < 0.95) was observed in 53 (48.2%) patients. On the MMAS scale, 53, 53 and 14 patients had a summary score of 0, 1–2 and 3–4 respectively (Table II).

Patients aged more than 40 years were less likely to be adherent (OR = 0.9; 95% CI: 0.42–1.93) than younger patients aged equal to or less than 40 years. Male patients were 2 times more likely to be adherent (OR = 2.22; 95% CI: 0.91–5.42) than female patients. Patients who were single had higher odds of being adherent (OR = 1.69; 95% CI: 0.68–4.22) than patients who were married. Patients who resided in rural areas (OR = 0.60; 95% CI: 0.27–1.32), those who take alcohol (OR = 0.48; 95% CI: 0.17–1.38), and those simultaneously taking any herbal medicine (OR = 0.48; 95% CI: 0.17–1.38) were less likely to be adherent. Patients with education up to primary school (OR = 1.04; 95% CI: 0.48–2.25), and patients who had to pay for their medicine (OR = 1.09; 95% CI: 0.38–3.14) were slightly more likely to be adherent. Patients who had been taking medication for more than 6 months (OR = 1.49; 95% CI: 0.62–3.59), those who had no care support from friends/family and hence depended on themselves (OR = 1.22; 95% CI: 0.57–2.62), those who had any kind of medication reminder (OR = 1.39, 95% CI: 0.61–3.17), and those who do not prefer taking medicine before food (OR = 1.42; 95% CI: 0.67–3.03) had higher odds of being adherent (Table III).

Reason for non-adherence among respondents

Table IV represents the reasons for non-adherence as reported by respondents. Of the 110 patients, 42 (38.2%) patients reported having missed taking their medication in the past one month preceding the survey. Reasons were given by these patients for missing or skipping medication as prescribed. Almost three-quarters (71.4%, $n = 30$) of the patients failed to take medication because they were too busy with work or other things and hence forgot. Healthcare-related reasons were

Table I. Characteristics of respondents ($n = 110$)

Parameter	Frequency (*n*)	Percentage (%)
Age [years]:		
≤ 20	3	2.7
21–30	18	16.4
31–40	44	40.0
≥ 41	45	40.9
Mean ± SD	39.7 ±11.39	
Gender:		
Male	27	24.5
Female	83	75.5
Marital status:		
Married	86	78.2
Single	24	21.8
Place of residence:		
Urban	37	33.6
Rural	73	66.4
Education:		
Primary	41	37.3
Secondary	47	42.7
Post-secondary	22	20.0
Pay for medicine:		
Yes	16	14.5
No	94	88.5
Duration of medication [months]:		
≤ 6	27	24.5
> 6	83	75.5
Supportive care:		
Yes	67	60.9
No	43	39.1

Table II. Individual questions of MMAS and its summary score

MMAS question items	No. of patients with "Yes" response	Percentage (%) (n = 110)
Do you ever forget to take your medicine?	44	40.0
Are you careless at times about taking your medicine?	21	19.1
Sometimes if you feel worse when you take the medicine, do you stop taking it?	8	7.3
When you feel better do you sometimes stop taking your medicine?	10	9.1
Summary score:		
0	53	Mean summary score is 0.946
1–2	43	
3–4	14	

also reported – 6 (14.3%) patients reported that they did not take medicine because the hospital was not able to refill their medication when they came to collect tablets. Other reasons for missing medication included patients giving up on survival (36.2%), and patients not believing at the time of having the disease (9.8%).

Discussion

This study focuses on adherence to ART among people living with HIV, provided either with cost or without cost at a local missionary hospital in southeastern Nigeria. The MMAS scale has been used several times by international authors to measure adherence to ART [11, 12].

Adherence is a major issue as far as management of chronic diseases is concerned. A meta-analysis of several studies showed that 70% of HIV patients were non-adherent [13]. HIV studies indicate that high levels of adherence are necessary for viral load suppression, prevention of resistance, and disease progression [14, 15]. When compared to just 55% of patients in North America, a meta-analysis of studies on ART adherence found that 77% of patients in Africa achieved 95% adequate adherence [16]. Studies from India have reported adherence rates of 76–93% [17–19].

In the present study, of 110 patients surveyed, a proportion of 53 (48.2%) patients were observed to be adherent as assessed by the MMAS. The level of adherence to ART was lower in our study as compared to other ART studies conducted in India [17–19]. This could be due to inadequate special counseling in the ART center. HIV-positive patients who visit the ART center for their monthly medicine are privileged to counseled by a doctor. However, counseling for patients is not compulsory and is allotted a limited time. Therefore, this can undermine patients' knowledge about the importance of adherence to ART for viral load suppression [20]. In another study [21], a great disparity was observed in patient counseling and level of adherence; patients with more counseling sessions and experiences were more adherent. Level of education attained may play a crucial role in the understanding of adherence as a fundamental and necessary aspect of the drug regimen.

The most common reasons for missing medication were forgetfulness due to being too busy at work or other things, giving up on life or hope for survival, lack of food due to financial constraints and finished pills. Similarly, several studies have revealed that cognitive status, financial constraints, travelling away from home and change in normal routine were the commonest reasons for missing pills [22, 23]. Other reasons include side effects, too many pills, and no improvement. There is also a concern that patients would stop taking pills once they felt better.

According to our study, men were more likely to be adherent than women. This finding is similar to a study which reported that women were less adherent than men [24]. Although adherence issues like forgetfulness, cost and confusion about how and why a medication should be taken seem to branch across gender, this observation could be considered valid. There are increasing research studies suggesting the gender differential in drug adherence observation to be a major concern that needs to be addressed accordingly. Psychosocial factors such as depression, forgetfulness, and cognitive impairment which tend to be more prevalent in women are significant contributors to poor medication adherence [6]. Also, a majority of caregivers at homes are women; caregivers have a tendency to prioritize others' health before their own [25]. Again, the inquisitive nature of women makes them likely to readily discuss health and medication issues with their friends and family; open access to misleading information frequently

Table III. Binary logistic regression of factors influencing adherence among respondents (n = 110)

Variables	Low adherence	High adherence	OR (95% CI)
Age [years]:			
≤ 40	33 (30.0)	32 (29.1)	1
> 40	24 (21.8)	21 (19.1)	0.90 (0.42–1.93)
Gender:			
Male	10 (9.1)	17 (15.5)	2.22 (0.91–5.42)
Female	47 (42.7)	36 (32.7)	1
Marital status:			
Married	47 (42.7)	39 (35.5)	1
Single	10 (9.1)	14 (12.7)	1.69 (0.68–4.22)
Place of residence:			
Urban	16 (14.5)	21 (19.1)	1
Rural	41 (37.3)	32 (29.1)	0.60 (0.27–1.32)
Education:			
Up to primary	21 (19.1)	20 (18.2)	1.04 (0.48–2.25)
Secondary and more	36 (32.7)	33 (30.0)	1
Pay for medicine:			
Yes	8 (7.3)	8 (7.3)	1.09 (0.38–3.14)
No	49 (44.5)	45 (40.9)	1
Medication duration [months]:			
≤ 6	16 (14.5)	11 (10.0)	1
> 6	41 (37.3)	42 (38.2)	1.49 (0.62–3.59)
Take alcohol:			
Yes	12 (10.9)	6 (5.5)	0.48 (0.17–1.38)
No	45 (40.9)	47 (42.7)	1
Taking herbal medicine:			
Yes	12 (10.9)	6 (5.5)	0.48 (0.17–1.38)
No	45 (40.9)	47 (42.7)	1
Supportive care:			
Yes	36 (32.7)	31 (28.2)	1
No	21 (19.1)	22 (20.0)	1.22 (0.57–2.62)
Problem in remembering:			
Yes	31 (28.2)	0 (0.0)	NA
No	26 (23.6)	53 (48.2)	
Medication reminder:			
Yes	19 (17.3)	14 (12.7)	1.39 (0.61–3.17)
No	38 (34.5)	39 (35.4)	1
Prefer taking medicine before food:			
Yes	34 (30.9)	27 (24.5)	1
No	23 (20.9)	26 (23.6)	1.42 (0.67–3.03)

Table IV. Reason reported for non-adherence by respondents (n = 42)*

Reason	No. of patients (n)	Percentage (%)
Felt better, hence I did not take medicine	6	14.3
Pills finished and were not refilled on time	7	16.7
Lack of food and therefore couldn't take medicine without food	9	21.4
Too busy with work or other things, hence forgot to take medicine	30	71.4
Was asked by a doctor to stop medication	6	14.3
Hospital did not refill medication when due	6	14.3
No improvement on medication	6	14.3
Medicine too strong to continue, i.e. side effects	5	11.9
Too many pills	4	9.5
No hope for surviving life	11	26.2
Did not believe in having the disease	4	9.8

**Assessed for respondents who reported to have missed taking their medication at any time in the past 1 month preceding the survey.*

leads to discontinuation of medication without the doctor's permission [26]. The three factors regarding psychosocial issues, caregiver status, and the inquisitive nature of women may be compelling reasons why women are less adherent than men.

Age has been found to be significantly associated with adherence in other studies [6, 17, 22, 23]. In most settings, it is thought that adherence declines with age. A possible explanation for this may be that taking medication requires less lifestyle alteration for older patients or that such alterations are less burdensome for older individuals who may easily accommodate pill taking into their daily activities. Older patients are also more likely to have prior experience of taking daily medication for age-related diseases. Gastrointestinal side effects such as nausea, vomiting, fatigue, rash, body ache, tingling and numbness in the feet were commonly reported. These side effects were also found to be common in another study [27].

In the present study, place of residence was not found to have a significant association with adherence. An explanation for this may be due to the availability of ART to most patients free of cost. In addition, the ART center used for this study is centrally located in a location midway through the city and rural settlement, making it easily accessible for both urban and rural dwellers at the same rate. However, income, education and place of residence have been found to be significantly associated with adherence in other studies [28, 29]. Also, respondents' level of education had no association with adherence.

Lack of support and social isolation have been found to be predictors of non-adherence to ART; social and family support, having a partner, peer interaction, not living alone and better relationships are characteristics of adherent patients [30, 31]. Similarly, in the present study, being married and having support from friends/family were also predictors of adherence.

Taking alcohol and herbal medicine simultaneously did not encourage adherence according to this study. Alcohol use is frequently implicated as a factor in non-adherence to ART. Several studies have collaborated this finding [32–34]. The potential for alcohol use to undermine the health status of HIV patients through non-adherence to medication raises significant concerns. Patients who are problem drinkers may forget to take their pills on schedule because they were drunk or busy with social functions at parties and bars. In alcoholics, underlying problems such as depression may lead to problem drinking and hence difficulty in medication adherence.

Some limitations of this study are acknowledged. Recall bias may have been possible among the respondents surveyed. Interviewer bias may have also been possible even though the research assistants were extensively trained to avoid this bias.

In conclusion, the level of adherence to ART in southeastern Nigeria is sub-optimal. Age, gender, taking alcohol, herbal medicine and having no medication reminder were predictors of non-adherence. For sustained success of the ART program, medical practitioners should find quality time for counseling patients on the importance and benefits of adherence. Priority should be given to patients with any form of addiction, and those who have the wrong perception about the medication regimen. Paramount attention should be given to improving and encouraging adherence in ART patients. Patient education must be

enforced at all levels of care. In order to optimally achieve this, clinicians should work with patients individually to develop strategies to help them adhere to their ARV medications.

Conflict of interest

The authors declare no conflict of interest.

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