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ORIGINAL ARTICLE

Adherence to Antiretroviral Therapy in Conflict Areas: A Study among Patients Receiving Treatment from Lacor Hospital, Uganda

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Abstract

The interaction between limited resources, living in conflict areas, and complexity of HIV treatment may impact negatively on adherence to antiretroviral therapy (ART). Nonadherence may lead to development of resistant strains that may further increase the costs of management. The aim of this study was to compare the level of adherence to ART among internally displaced persons (IDPs) and non-IDPs and determine the factors associated with nonadherence. A cross-sectional study was conducted from January to February 2008 among adults receiving ART from Lacor Hospital. Systematic sampling was used to select 200 participants. Adherence was assessed through patients' self-reports over a 4-day period. Data were collected using an interviewer-administered questionnaire and analyzed in SPSS version 12 (SPSS Inc, Chicago, IL). Patients were considered to be adherent if they took 95% or more of their medicines. Adherence rates among IDP and non-IDP patients were compared using Mann-Whitney *U* test. Factors associated with nonadherence were determined using logistic regression. The overall mean 4-day adherence was 99.5%. There was no significant difference in adherence between IDPs and non-IDPs (99.6% and 99.5%, respectively). Being on first-line regimen of ART (odds ratio [OR] = 22.22, 95% confidence interval [CI] = 1.48–333.33) and feeling that staff at the health centre were condemning (OR = 22.22, 1.53–333.33) were independently associated with nonadherence. Our study was limited in using only self-reports to assess adherence. In conclusion, patients in conflict areas can achieve high levels of adherence. Interventions to reduce nonadherence should address health provider–patient interaction and patients on first-line regimens.

Introduction

The introduction of antiretroviral therapy (ART) in the management of HIV/AIDS has greatly reduced mortality and morbidity and has improved the lives of persons living with HIV.[1,2] However, for maximal benefits of the treatment, patients' adherence should be as close to 100% as possible.[3–5] Newer boosted protease inhibitor (PI)-based regimens and the non-nucleoside reverse transcriptase inhibitor-based regimens do not have as strict requirements for adherence as the older nonboosted PI regimens because patients on the former can achieve viral suppression at lower levels of adherence. However, this does not affect the goal of achieving the highest possible level of adherence to treatment.[5] This requirement for high levels of adherence poses problems because patients on long-term treatment as in HIV/AIDS tend to miss their medications because of the great practical and emotional demands of the therapy.[6] Nonadherence has been cited as the most common reason for failure to achieve maximal viral suppression.[7–10] This increases the risk of development of drug-resistant strains of HIV in addition to treatment failure. It limits the future options for management of the individual patient as well increasing the risk of spread of drug resistant strains.[4] This is of public health importance especially in areas of conflict where congestion, rape, and other complexities like poverty may lead to increased spread of HIV. Furthermore, there may be increased costs of care due to modification of treatment to second-line regimens that are more expensive and also increased use of drugs for opportunistic infections.

The prevalence of HIV in the conflict areas of Northern Uganda has been cited at about 8.2% which is above the national prevalence of 6.7%[11] Many of the people have been living in internally displaced persons (IDP) camps for the last 20 years. The problems of conflict areas such as lack of food

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and clean water, social disruption, limited access to health services, and psychosocial trauma may all interplay to increase the level of nonadherence. This may in turn lead to increased transmission of HIV due to increase in viral loads. High viral loads have been found to increase the risk of transmission of HIV-1.[12] Maximal benefits from ART should be realized in these areas so as to limit the impact of HIV on a community already overwhelmed by problems associated with conflict. It was therefore important that we determine the prevalence of nonadherence in this area, compare it among persons living in IDP camps and determine the factors associated with nonadherence.

Methods

Patients

We performed a cross-sectional study from January to February 2008 among 200 patients on ART. The patients were sampled from Lacor Hospital in Gulu District using systematic sampling procedure. Every other patient that met the selection criteria was included in the study. The main selection criteria of the study included: age of 18 years and above, receiving care from Lacor Hospital during the study period, and giving informed consent to participate in the study. Patients who were very ill were excluded.

Lacor Hospital is a missionary founded not-for-profit organization that provides free HIV care to patients. It has over 1800 patients on ART. Some of the patients seen at this hospital are from the IDP camps mainly in or around Gulu and Amuria Districts while others stay in their homes outside the IDP camps. The study was approved by Makerere University Faculty of Medicine Research and Ethics Committee and Lacor Hospital administration.

Data Collection

The data were collected by two trained research assistants using a semistructured questionnaire. We collected data on patient demographics and possible predictors of nonadherence including patient factors, e.g., duration on ART, knowledge about ART, attitudes, beliefs, perceived barriers to self-care, lifestyle characteristics; drug-related factors, e.g., type of ART, pill burden, dosing frequency, adverse effects; health service factors, e.g., distance to the health facility, availability of drugs; social factors, e.g., social support, housing type; and clinical factors, e.g., CD4 cell count. Adherence was assessed over a 4-day period preceding the interview using patients' self reports. Nonadherence was defined as adherence levels below 95%. The questionnaire was translated into the main local language of the area (Luo). The data were entered in Epi-Info 2002 (Centers for Disease Control and Prevention, Atlanta, GA) and exported to SPSS version 12.0 (SPSS Inc., Chicago IL) for statistical analysis.

Data analysis

To compare the adherence levels among persons living in IDPs and those outside the IDPs, we used the Mann-Whitney *U* test. We used logistic regression to identify the factors associated with nonadherence. Bivariate analysis was done to assess the association between the various independent variables and nonadherence. All variables with p values not more than 0.2 at bivariate analysis were considered for multivariate analysis. The measure of association was the odds ratios and these were determined with their 95% confidence intervals. A p value less than 0.05 was considered statistically significant.

Results

Of the 200 patients who were recruited, 29% ($n = 58$) were living in IDP camps. Most of the participants were in the age group 21 to 40 years (63.5%, $n = 127$). The majority of the sample comprised: females (67.5%, $n = 135$); married (44%, $n = 88$); unemployed (86%, $n = 172$), and those with primary level education. Most of the participants had spent more than 24 months on ART (37.5%, $n = 75$). The characteristics of the participants are summarized in Table 1.

The overall mean 4-day adherence was 99.5%. There was no significant difference in adherence between IDP and non-IDPs (99.6% in IDPs versus 99.5% in non-IDPs, $p = 0.86$). When adherence was categorized, 1.7% ($n = 1$) IDPs as compared to 2.1% ($n = 3$) non-IDPs were not adhering to treatment. The proportions of nonadherent patients were not significantly different ($p = 0.86$). The overall prevalence of nonadherence was 2% (95% confidence interval [CI] = 0.06%–4.06%). The reasons for missing drugs given by the participants included depression after losing a child, forgetfulness, traveling, and not getting the medication in time.

When the independent variables were associated with nonadherence at bivariate analysis (Tables 2–4), only being on first-line combination, patient's feeling that there was no privacy at the health centre, that the staff were condemning, and that staff were not respectful were significantly associated with nonadherence. At multivariate analysis, being on first line regimen (odds ratio [OR] = 22.22, 95% CI = 1.48–333.33) and patient's feeling that staff were condemning (OR = 22.22, 95% CI = 1.53–333.33) were significantly associated with nonadherence. Patients' feeling of lack of privacy at the health center was retained in the final logistic regression model because of its confounding relationship with patients' feeling

Table 1. Characteristics of Study Participants

Variable	*Frequency (%)*
Age	
21–40	127 (63.5)
41–60	70 (35.0)
>60	3 (1.5)
Females	135 (67.5)
Education level	
None	32 (16.0)
Primary	122 (61.0)
Secondary	37 (18.5)
Postsecondary	9 (4.5)
Marital status	
Married	88 (44.0)
Single	13 (6.5)
Divorced/separated	33 (16.5)
Widowed	66 (33.0)
Residence outside camp	142 (71.0)
Unemployed	172 (86.0)
Duration on ART	
≤12months	66 (33.0)
13–24 months	59 (29.5)
>24 months	75 (37.5)

ART, antiretroviral therapy.

Table 2. Association Between Sociodemographic, Social Support, and Nonadherence

Variable	*Nonadherence* (n) %	*OR (95% CI)*	p *value*
Age			
20–40	4 (3.1)	0.00	0.13
≥41	0 (0)		
Gender			
Male	2 (3.1)	2.11 (0.29–15.38)	0.60
Female	2 (1.5)		
Marital status			
Married	4 (4.5)	0.00	1.00
Not married	0 (0)		
Education level			
None or primary	3 (1.9)	0.87 (0.09–8.55)	1.00
Secondary or tertiary	1 (2.2)		
Residence			
Inside camp	1 (1.7)	0.81 (0.08–8.00)	1.00
Outside camp	3 (2.1)		
Occupation			
Employed	1 (3.6)	2.09 (0.21–20.83)	0.46
Unemployed	3 (1.7)		
Housing type			
Temporary	4 (2.2)	0.00	1.00
Permanent	0 (0)		
Live with family			
Yes	4 (2.1)	0.00	1.00
No	0 (0)		
Have home based NGO support			
Yes	1 (1.3)	0.49 (0.05–4.83)	0.66
No	3 (2.5)		
Have someone to remind to take medication			
All the time	3 (2.1)	1.23 (0.13–12.05)	1.00
Sometimes/not at all	1 (1.7)		
Have someone to help when confined to bed			
All the time	3 (1.9)	0.89 (0.09–8.77)	1.00
Sometimes/not at all	1 (2.2)		

OR, odds ratio; CI, confidence interval; NGO, nongovernmental organization.

Table 3. Drug Related Factors and Beliefs Associated with Nonadherence

Variable	*Nonadherence* n *(%)*	*OR (95% CI)*	p *value*
Treatment duration			
0–18 months	2 (2.1)	1.06 (0.15–7.69)	1.00
>18 months	2 (1.9)		
Health status after ART initiation			
Good–excellent	4 (2.0)	0.00	1.00
Fair–poor	0 (0)		
Know CD4 count			
Yes	4 (2.0)	0.00	1.00
No	0 (0)		
Recent CD4 count			
<200	1 (1.4)	0.54 (0.05–5.24)	1.00
≥200	3 (2.6)		
Total daily doses			
One	1 (1.3)	0.53 (0.05–5.15)	1.00
Two	3 (2.4)		
ARV combination			
First line[a]	2 (8.3)	7.94 (1.06–58.82)	0.05
Second line[b]	2 (1.1)		
Belief that health workers doing enough			
Yes	4 (2.0)	0.00	1.00
No	0 (0)		
Believe ARVs cure disease			
Yes	1 (1.6)	0.74 (0.08–7.25)	1.00
No	3 (2.2)		
Believe ARVs alleviate symptoms and improve on health			
Yes	4 (2.2)	0.00	1.00
No	0 (0)		
Think ARVs are just for consolation			
Yes	0 (0)	0.00	1.00
No	4 (2.0)		
Take alcohol			
Yes	1 (4.0)	2.39 (0.24–23.81)	0.42
No	2 (1.7)		

[a]Includes AZT/3TC/NVP, AZT/D4T/3TC/NVPEFV and AZT/3TC/EFV.

[b]Includes TDF/FTC/NVP, TDF/FTC/EFV, TDF/FTC/LPV+RTV and AZT/3TC/LPV+RTV.

OR, odds ratio; CI, confidence interval; ART, antiretroviral therapy; ARV, antiretrovirals.

that staff was condemning. Patients' feeling that staff was not respectful was not significantly associated with nonadherence at multivariate analysis. Results of multivariate analysis are summarized in Table 5.

Discussion

Adherence to ART in this population was generally high with average adherence rates above 99%. Overall approximately only 2 in every 100 patients was not adhering to ART. There was no significant difference among patients living in and those outside the IDP camps. This level of adherence implies that patients in this area have very high adherence levels despite the social disturbances experienced in the area. The level of adherence is indeed higher than we had anticipated because we expect patients in this area to have high levels of posttraumatic stress.[13] The latter has been linked to nonadherence.[14–16] However, there is very high possibility that patients overestimated their adherence. Assessment of adherence using self reports as we did leads to patients overestimating their adherence.[17] This is even more likely in these people who have lived in fear over the last two decades. The patients living outside the IDP camps were not different, possibly because they have all suffered the trauma caused by the war. The prevalence of nonadherence found in our study is higher than that of 8% found in another study conducted among patients in The AIDS Support Organization (TASO)

Table 4. Bivariate Analysis of Perceived Barriers to Health Care and Nonadherence

Variable	*Nonadherence* n *(%)*	*Or (95% CI)*	p *value*
Treatment centre far			
Yes	4 (3.1)	0.00	0.34
No	0 (0)		
Fear traveling to health center			
Yes	1 (5.0)	3.11 (0.31–31.25)	0.35
No	3 (1.7)		
Lack privacy at health center			
Yes	2 (12.5)	12.99 (1.70–100.0)	0.03
No	2 (1.1)		
Spend much money moving to health center			
Yes	4 (4.1)	0.00	0.05
No	0 (0)		
Staff is condemning			
Yes	2 (16.7)	18.57 (2.37–142.86)	0.02
No	2 (1.1)		
Staff respect me			
Yes	2 (1.1)	0.11 (0.01–0.81)	0.06
No	2 (9.5)		
Staff give enough drug information			
Yes	4 (2.0)		1.00
No	0 (0.0)		
Drugs are sometimes not available at health center			
Yes	1 (11.1)	11.36 (0.93–142.86)	0.13
No	2 (1.1)		
Long wait to see doctor or get medication			
Yes	3 (3.6)	4.35 (0.44–43.48)	0.31
No	1 (0.9)		
Instructions are difficult to follow			
Yes	1 (2.6)	1.39 (0.14–13.70)	0.58
No	3 (1.9)		

CI, confidence interval; OR, odds ratio.

Table 5. Results of Multivariate Logistic Regression of Nonadherence and Independent variables

Variable	*OR (95% CI)*	p *value*
ARV combination		
1st line[a]	22.22 (1.48–333.33)	0.03
2nd line[b]		
Staff is condemning		
Yes	22.22 (1.53–333.33)	0.02
No		
Lack of privacy at the health centre		
Yes	9.71 (0.90–111.11)	0.06
No		

[a]Includes AZT/3TC/NVP, D4T/3TC/NVP and AZT/3TC/EFV.
[b]Includes TDF/FTC/NVP, TDF/FTC/EFV, TDF/FTC/LPV+RTV and AZT/3TC/ LPV+RTV.
OR, odds ratio; CI, confidence interval; ARV, antiretroviral.

Gulu, Uganda.[18] However, both figures show that high levels of adherence can be achieved in conflict areas.

Patients on first-line regimen were more likely not to adhere than those whose regimen had been changed. This is likely to be due to patients whose treatment has been modified perceiving themselves as more ill and therefore more likely to adhere to treatment. According to the health belief model, patients that perceive themselves to be at risk will usually undertake health actions more than those who do not.

Nonadherence was higher among patients who thought the health providers were condemning. A poor patient–provider relationship has been cited as one of the hindering factors to information sharing between the patient and health worker.[19] This may lead to nonadherence because patients may not understand their dosing regimen or the importance of taking their medicines. However, patients' perceptions of health workers being condemning could have been associated with the way they perceive their disease. This may make them secretive and thus lead to nonadherence.

At bivariate analysis there was a significant association between lack of privacy and nonadherence. However, at multivariate analysis there was a confounding relationship between lack of privacy and health workers being condemning. This relationship suggests that the patients who say that the health workers are condemning have probably not dealt with their disease yet and feel a need to conceal it from other people. This may lead to nonadherence because they will only take the drug when there are no other people nearby.

None of the sociodemographic, drug-related, clinical, and social factors was significantly associated with nonadherence. This may be because of the small numbers of patients that were not adhering. We therefore did not have sufficient power to detect any association.

Our study was limited in using only self-reports to assess adherence because this could have led to overestimates of adherence levels. However, it has been found that patients who report nonadherence are truly likely not to be adhering to treatment.[17] In addition, assessment of adherence over a 4-day period may not have given a true reflection of how patients have been adhering over a long period of time. It has, however, been found to minimize problems of recall that happen when assessments are done over long periods of time. The sample size may not have been adequate to detect significant associations especially considering that there were very few patients not adhering to treatment. This is especially shown by the very wide confidence intervals that we obtained indicating low precision.

In conclusion, there was high level of adherence to ART in this conflict area and this should continue to be strengthened. There was no difference in adherence among patients that were living in IDP camps and those living outside. There is need to address adherence issues among patients on first line treatment and those that have barriers to self care.

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Author Disclosure Statement

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