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### ► **To cite this version:**

Annelie Karin Gusdal, Celestino Obua, Tenaw Andualem, Rolf Wahlström, Göran Tomson, et al.. Voices on adherence to ART in Ethiopia and Uganda: A matter of choice or simply not an option?. AIDS Care, 2009, 21 (11), pp.1381-1387. 10.1080/09540120902883119 . hal-00545375

**HAL Id: hal-00545375**

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Submitted on 10 Dec 2010

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Journal:	<i>AIDS Care - Psychology, Health &amp; Medicine - Vulnerable Children and Youth Studies</i>
Manuscript ID:	AC-2008-10-0470.R1
Journal Selection:	AIDS Care
Keywords:	adherence, antiretroviral therapy, East Africa, HIV/AIDS, qualitative research



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For Peer Review Only

## Abstract

This paper explores HIV patients' adherence to antiretroviral treatment (ART) in resource-limited contexts in Uganda and Ethiopia where ART is provided free of charge. Qualitative semi-structured interviews were conducted with 79 patients, 17 peer counsellors and 22 providers in ART facilities in urban and rural areas of Ethiopia and Uganda. Interviewees voiced their experiences of, and views on ART adherence both from an individual and a system level perspective. Two main themes emerged from the content analysis: "Patients' competing costs and systems' resource constraints" and "Patients' trust in ART and quality of the patient-provider encounters". The first theme refers to how patients' adherence was challenged by difficulties in supporting themselves and their families, paying for transportation, for drug refill and follow-up as well as paying for registration fees, opportunistic infection treatment and expensive referrals to other hospitals. The second theme describes factors that influenced patients' capacity to adhere: personal responsibility in treatment, trust in the effects of antiretroviral drugs, and trust in the quality of counselling. To grant patients a fair chance to successfully adhere to ART, transport costs to ART facilities need to be reduced. This implies providing patients with drugs for longer periods of time and arranging for better laboratory services, thus not necessitating frequent revisits. Services ought to be brought closer to patients and peripheral, community-based healthworkers used for drug distribution. There is a need for training providers and peer counsellors, in communication skills and adherence counselling.

## Introduction

The launch of the World Health Organization's (WHO) "treat 3 million by 2005" initiative in 2003 has led to a rapid scale-up of ARV treatment (ART) programs with 67% of the people now receiving ART in sub-Saharan Africa, compared with 25% in late 2003 (WHO, UNAIDS, UNICEF, 2007). The weak health infrastructure and scarce human resources for health in this region limit patient retention in some ART programs to as low as 60% in the first two years (Rosen, Fox & Gill, 2007). An increased understanding of the complex dynamics associated with adherence to ART is important, as it is the most powerful predictor of treatment success and survival for people living with HIV/AIDS, and also necessary to prevent drug resistance (Bangsberg et al., 2001; Bangsberg, 2006; Garcia de Olalla, Knobel, Carmona, Guelar, López-Colomé & Caylà, 2002). The necessity of strict adherence to ARV treatment forces patients to behave in ways that may not be easily incorporated into their daily lives (Vervoort, Borleffs, Hoepelman & Grypdonck, 2007).

Few studies have looked into the challenges to long-term adherence in a sub-Saharan setting (Weiser, 2003) and qualitative methods have been particularly underutilized (Remien, Hirky, Johnson, Weinhardt, Whittier & Le, 2003). Determinants of adherence to ART need to be explored both from a health system aspect and from an individual perspective (Gilks et al., 2006; Schneider, Blaauw, Gilson, Chabikuli & Goudge, 2006; Sarna, Pujari, Sengar, Garg, Gupta & Dam, 2008). Serving this purpose, the INRUD-IAA project was initiated to develop and test indicators of adherence, gather new knowledge on factors influencing adherence and define and test feasible interventions (Chalker, 2007; Chalker et al.; INRUD-IAA, 2008). The aim of this study was to explore the views and experiences of patients, providers and peer counsellors on adherence to ART in Ethiopia and Uganda.

## Methods

### Study context

Ethiopia has 77.4 million inhabitants with an estimated 980 000 HIV infected adults in 2007, and 50-100 000 new cases per year. Uganda has a population of 28.8 million with an estimated 940 000 HIV infected adults and 10-50 000 new cases per year (UNAIDS, 2008). In 2005, there were 73 facilities providing ART in Ethiopia and 175 in Uganda (WHO, UNAIDS, UNICEF, 2006).

The study was conducted in six ART facilities in each Ethiopia and Uganda between May and August 2007. In a survey on indicators conducted in both Ethiopia and Uganda (Chalker, 2007; Chalker et al.), 20 purposefully selected ART facilities in each country were ranked as having high, medium or low performance of adherence, according to defined indicators. The existence of a community network with support groups and community based volunteers, mediated by the facility's peer counsellors and providers and a well-organised record keeping system was a distinction between high- and low-performing facilities. Moreover, high performing facilities displayed a more clear concern among providers to build a committed team and a drive to improve the services.

Six facilities in each country were chosen for this more in-depth study, two from each performance level. Median travel time was 64 minutes (range 15-169) in Ethiopia, and 89 minutes (range 35-149) in Uganda, while waiting time in the facilities was 99 (range 35-284) and 182 (range 20-392) minutes, respectively. Patient load per week ranged between 175 and 750 in Ethiopia, and between 105 and 2045 in Uganda. Patient load and human resources per facility are shown in table 1. The facilities in Ethiopia were all urban government hospitals, while there were both governmental and non-governmental

hospitals and healthcare centres in Uganda. The facilities were situated in rural and urban settings in different regions of each country

Insert Table 1 here

### **Participants and eligibility**

A total of 118 semi-structured, in-depth interviews were conducted. During two consecutive days, adherence nurses and doctors asked their visiting patients to participate in an interview. Patients were eligible to participate if they were: a) HIV positive, b) 18 years or older, c) on ART for six months or more, and d) able to give informed consent. The providers and peer counsellors working during these two days were approached by the research team and those consenting to participate were included. Only a few denied because of time constraints.

In Ethiopia, interviews were held with 38 patients (26 women and 12 men), 12 peer counsellors, four adherence nurses and professional counsellors, five medical doctors and seven pharmacists. The patients' median age was 36 years (range 24-58), and the mean duration of ART was 19 months (range 6 months-6 years). In Uganda, 41 patients (20 women and 21 men), five peer counsellors, two adherence nurses and professional counsellors, two clinical officers and two medical doctors were interviewed. The patients' median age was 35 years (range 26-53), and the mean duration of ART was 23 months (range 6 months-7 years).

### **Data collection process and ethical considerations**

The interviews were performed by nine experienced and trained interviewers in venues

convenient for the participants, lasted 30-90 minutes and followed a semi-structured guide of open-ended questions with follow-up probes as needed. While interviews with patients continued until saturation was reached, saturation of interview data from peer counsellors and providers was not fully achieved in facilities where their number and availability was limited.

The interview guide (obtainable from first author) was designed to elicit information from different perspectives on patients' experiences of ART, and explore the roles of the patient, provider, peer counsellor, health system and community in supporting adherence. The interviews were conducted in English, Amharic, Luganda or local languages and were audiotaped for subsequent translation into English by research assistants fluent in the local languages.

In both countries, verbal or written consent was obtained prior to each interview and interviewees' anonymity was guaranteed. Approval was obtained from the Institutional Review Board at Medical Faculty, Makerere University in Uganda, and the Drug Administration and Control Authority (DACA) in Ethiopia.

### **Data analysis**

Qualitative content analysis (Graneheim & Lundman, 2004) of the interview transcripts was performed using the QSR NVivo software program (NVivo7, 2006). The transcribed material was read several times in order to get a general sense of the content. An inductive approach was taken to allow conceptual clusters of ideas and patterns to emerge. This process included a descriptive phase of identifying meaning units and assigning codes, which were then compared and reorganized into tentative categories.



The relationships between these categories were analyzed, and two themes emerged. Coding and analysis was carried out by the first author (AKG), and discussed and revised in several stages together with the co-authors.

## Results

Two themes emerged from the analysis. The first theme describes how patients struggle to meet basic needs and pay for ART related costs, and the difficulties of the system to support the patients. The second theme shows both how patients, despite their struggles, feel a personal responsibility to adhere to treatment and place trust in the ARVs, and how the resource constraints impede efforts to provide high quality of counselling at the ART facilities.

### **Patients' competing costs and systems' resource constraints**

This theme describes factors related to economic resources both on an individual and system level.

#### Patients' financial struggles with ART related costs

The main reason for non-adherence was patients' difficulties in meeting their basic needs, which put them in a situation of prioritising between the life-saving ART and spending their money on food. ARVs were free of cost in both countries but there were recurrent registration fees in Uganda. There were also high costs for transportation, for opportunistic infection (OI) drugs and expensive referral to other hospitals due to insufficient laboratory equipment in both countries. Patients' resignation, helplessness, loss of social independence and feeling of having no choice, were often associated with their inability to work or otherwise provide for their needs. Facing such difficulties,

adherence was not even perceived as an option, despite the desire to adhere and an understanding of the consequences of neglect.

*Good economic condition is a factor that facilitates adherence. If patients' economic problems are not properly addressed they have to choose between living a miserable life, and death. [Female patient, 38 yrs, Ethiopia]*

*With this medicine, without food you can go mad. That is why many refuse to take it when they know there is no food. [Female patient, 32 yrs, Uganda]*

Travelling from distant areas to the facility with costly transportation competed with other essential costs and thus challenged the patients' capacity to collect their drugs. Some patients found different temporary solutions, such as borrowing money from friends or organizing joint transportation.

*We have no choice but to come to this hospital every month to get the medicine. What is challenging for us is commuting between here and our place, and the transportation expense. I can't give up because it is a matter of life. [Male patient, 45 yrs, Ethiopia]*

#### Health systems' resource constraints

In Uganda, missing the day of appointment could mean returning home without a refill of ARVs since two facilities were open only a few days per week. Some facilities administered drugs for only two weeks, which made transportation costs even more expensive and introduced a risk of losing patients. Providers and peer counsellors

stressed that if drug availability was secured at system level, patients would be more willing to come to the facilities.

While financial constraints caused feelings of helplessness among the patients, providers communicated similar feelings when they were unable to deliver the drugs as expected.

*We are always telling the patients not to miss their drugs. They are supposed to take them every day but at the end of the day, you yourself don't have the drugs to give to the patients.* [Clinical officer, Uganda]

Joint voices expressed frustration over drug shortages and stock-outs. In both countries, providers sometimes took some of their own money and gave it to their patients to enable them to buy OI drugs from outside the facilities.

### **Patients' trust in ART and quality of the patient-provider encounters**

This theme describes how the providers' and peer counsellors' reception and counselling skills influenced patients' adherence. It also shows that the counselling was embedded in a context where not only patients but also providers and peer counsellors faced structural limitations.

#### Motivation and trust mediated in patient-provider encounters

All patients spoke of their own responsibility to live safely and respect the treatment as key motivational factors for adherence.

*When the medicine is free, your responsibility is to follow it up properly and*

*convince yourself. This is serious. This is a matter of life.* [Female patient, 26 yrs, Ethiopia]

*We should also behave according to the rules and regulations of the medicine.*  
[Female patient, 35 yrs, Uganda]

Patients' sense of self-preservation in order to pay for school fees and plan for their children's future as well as strong wishes to sustain social independence further motivated patients to adhere. Providers engaged in strengthening this motivation by encouraging patients to maintain their health and accept taking ART as prescribed.

*Once you have children at least it can give you time to take them to school, to plan for them, to build and do some necessity for them.* [Peer counsellor, Uganda]

The trust patients developed in the ARVs when they experienced weight gain, received improved laboratory results and other positive effects in health status usually supported adherence. Actual events of adverse drug reactions (ADRs) and fear of possible ADRs were severely challenging adherence. Overcoming these difficulties was best accomplished with support from providers. While an interaction based on trust between patients and providers was expressed as essential for a successful adherence, the patients could easily lose their trust in the ART if they felt that the providers did not take their concerns seriously. Providers even seemed ignorant of the great problems that patients obviously met in relation to ADRs. Such undesirable effects of ART could result in patients questioning whether it was worth continuing with the treatment. Providers paid more attention to patients' deterioration in health status and default in adherence when contracting OIs. With no capacity to pay for the treatment, OIs

sometimes led patients to abandon ART.

*When they are sick with OI, they easily give up hope. Again they can have additional illness like gastric problem or lung disease. They may not have money to get medical treatment. [Adherence nurse, Ethiopia]*

#### Encounters influenced by structural factors

Providers perceived that giving each patient sufficient counselling time to ensure that they understood the drug regimen correctly and to give them reassuring and adequate feedback was supportive of patients' adherence. The following quote illustrates the providers' understanding for patients' hardships.

*They may have other problems somewhere, reassure them, and show the advantages and disadvantages being on ART. There are no irrational people unless they are misunderstood. Patients have many problems so we have to be patient and handle them with care. [Adherence nurse, Ethiopia]*

While these interpersonal relationships with patients were recognized as central, they were severely hindered by untenable working conditions. Devoted providers, some days handling more than 50 patients, experienced fatigue over non-adherent and otherwise problematic patients. They felt that they delivered insufficient adherence counselling and had no time for reflection. They strived to offer patients hope and support even though they received very few incentives and little encouragement from the facility management. The providers' work situation and time for counselling had to be balanced against structural shortcomings in all facilities, irrespective of performance levels.

In the course of a facility visit, patients had several encounters with different staff members, each of them important for the patients' wellbeing. A negative reception by, for example, a data clerk or laboratory technician was perceived as very discouraging. Patients were especially concerned about the lack of confidentiality and sometimes even unkindness in the laboratory setting. Despite these worries, the patients' accounts suggested that the providers considerably influenced patients' satisfaction and feelings of trust in ART. They often expressed confidence in the providers' medical knowledge and counselling skills.

## Discussion

To adhere to treatment, the patients had to overcome great challenges. They lacked financial security and travelled long distances to ART facilities. They had no alternatives if side effects were not recognised or if they were dissatisfied with counselling. The two themes reflect some of the challenges patients faced when striving for adherence. A sense of helplessness and resignation was connected to patients' inability to meet basic needs since costs related to ART competed with those for everyday survival. These financial constraints caused severe frustration, regardless of ARVs being free of charge, as was also found by Hardon et al. (2007).

Patients' adherence was strongly related to their own sense of responsibility which should be viewed against the potent structural barriers and, to some extent, patients' self-blame for not reaching an even higher adherence.

Providers identified patients' financial constraints resulting in difficulties with transportation, coupled with frequent refills and insufficient laboratory services as the most important barriers to adherence. A suggested approach on how to overcome costs

for transportation was developing satellite centers linked to the facility, which would decongest the central facility, and bring services closer to patients. Weidle et al. (2006) showed excellent retention in care and improved adherence in Uganda when a home-based care program was implemented, although perhaps not financially sustainable.

Patients' needs in counselling relating to challenges with ADRs were not met. The importance of clearly explaining possible side effects at initiation and in every follow-up visit to prepare patients for unpleasant and distressing side effects, combined with advice how to handle them, was concluded in a review (Garcia de Olalla et al., 2002). Good collaboration between the patient and the healthcare provider in identifying challenges and making appropriate accommodations has also been stressed by others (Johnson et al., 2006; Chesney, 2003). Since ADRs challenge adherence, providers of ART program ought to be aware of how patients negotiate their intention to follow the prescription as directed in order to avoid ADRs (Sarna et al., 2008). Nevertheless, patients had an accepting attitude towards even severe ADRs, possibly related to the well known physical, social and emotional setbacks associated with untreated AIDS, which is in contrast to patients in resource-rich settings (Ammassari et al., 2001). Our findings confirm the need for an affirmative, confidential therapeutic alliance between patients and providers to enhance patients' satisfaction and feelings of trust in the treatment.

Only a few previous qualitative studies in a sub-Saharan context have looked into factors of importance to adherence from both an individual and a system level perspective (Mills et al., 2006). Adherence rates among patients in sub-Saharan settings seems to be equivalent or even superior to adherence rates in most high-income countries (Weiser et al., 2003; Mills et al., 2006; Nguyen, YapoAko, Niamba, Sylla & Tiendrébéogo, 2007;

Akileswaran, Lurie, Flanigan & Mayer, 2005). Previous studies provide promising evidence that ART can be feasibly administered in resource-limited settings (Akileswaran et al., 2005). Our findings emphasize that attention must be paid to how individuals negotiate the challenges that they face in everyday life.

## **Methodological considerations**

Direct experiences of non-adherent patients lost to follow-up could not be gathered in this facility-based study, as information was obtained from patients who actually did turn up at the facilities.

The data was analysed as one material, cutting across the two countries and the three adherence performance levels of facilities. Some issues were more or less salient for specific facilities, but our analyses did not reveal any consistently different themes in terms of challenging and supportive factors for adherence.

## **Conclusions**

When structural and individual challenges were too overwhelming, continuing ART was not perceived as an option by patients. To give patients a fair choice to successfully adhere to ART, transport costs to facilities need to be reduced, by providing patients with drugs for longer periods of time and making arrangements for better laboratory services. Services ought to be brought closer to patients and peripheral community-based healthworkers used for drug distribution. There is a need for training providers and peer counsellors in communication skills and adherence counselling.



## **Acknowledgements**

There are no conflicts of interest.

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Table 1 Patient load and human resources in twelve facilities for ART in Ethiopia and Uganda

<i>Observations in facilities</i>	<i>Facilities in Ethiopia</i>						<i>Facilities in Uganda</i>					
	1	2	3	4	5	6	1	2	3	4	5	6
Patient load/week	600	750	175	350	300	600	2045	357	150	105	189	167
Clinicians	6	5	2	2	3	4	7	5	3	3	5	2
Nurses	4	7	1	1	3	1	2	11	1	2	9	1
Social workers	1	-	-	2	8	-	1	-	-	1	2	-
Pharmacists and pharmacy technicians	3	3	1	2	2	4	1	2	2	1	3	-
Data clerks	1	4	1	-	2	2	1	2	1	-	2	-
Laboratory technicians	2	1	2	1	2	2	2	3	2	2	2	1
Peer counsellors	-	2	2	2	11	11	4	6	3	2	4	1

05-March-2009

Authors' response to comments from referees

Re: "Voices on adherence to ART in Ethiopia and Uganda: A matter of choice or simply not an option?"

Referee(s)' Comments to Author:

Referee: 1

*Comments to the Author:*

This paper explores the views and experiences of patients and providers of care on adherence to antiretroviral therapy in Ethiopia and Uganda. Overall, I found the paper clearly written. Also, the subject of the paper is highly relevant. However, I have a few questions for clarification.

*Comments to the Author:*

In the method section, it is described that interviews were conducted at two facilities with a high, medium and low performance level of adherence, respectively. It was unclear to me, how this performance level was determined and what the differences in adherence were of the three performance levels.

*Authors' reply:*

During the first phase of the INRUD-IAA project work, a set of indicators to monitor adherence in ART programmes was developed, covering 20 facilities in each country, providing ART to a minimum of 100 patients. Examples of adherence measurements/indicators used for stratification were:

patient load/week, opening hours/week, convenient opening hours (evenings and weekends), patients/hour/clinician, patients/week/support staff, access to laboratory services (%), private space for counselling (%), ARVs in stock (%), key medicines in stock (%), supply in days of ARVs given to new and ongoing patients, connection with the local community, linking new patients to PLWHA, provision of food, provision of child care, use of ART guidelines.

Some facilities had low values, particularly for indicators on dispensing-based adherence and patient attendance and some had medium and high values. Generally, factors for better performance included, having a community linkage/programs, fairly good staffing situation, stable drug supply, fully functional laboratory and good team work. Facilities with an intra-facility referral (integration of services) and those who were able to hold regular review meetings involving PLWHA (People living with HIV/AIDS), and had a systematic patient tracking/records also allowed for better performance.

It should be emphasized that while the first phase of the INRUD-IAA project focused on stratifying facilities into performance levels using these indicators, this paper focused on exploring views and experiences of adherence at an individual level. However, according to the reviewers' suggestions we have revisited the material and included the most prominent differences between performance levels in the result section; please see our answer on page 3.

*Comments to the Author:*

I think the authors should describe more clearly how patients were selected to participate in the interviews. Broad inclusion criteria are presented, and I expect that far more patients fulfilled these criteria than were interviewed. Also, it is unclear how and according to which criteria peer counsellors and members of staff were selected to participate in the study.

*Authors' reply:*

Clarifications on selection process and selection criteria of participants are added into the paper: *A total of 118 semi-structured, in-depth interviews were conducted. During two consecutive days, adherence nurses and doctors asked their visiting patients to participate in an interview. Patients were eligible to participate if they were: a) HIV positive, b) 18 years or older, c) on ART for six months or more, and d) able to give informed consent. The providers and peer counsellors working during these two days were approached by the research team and those consenting to participate were included. Only a few denied because of time constraints.* (Methods section, Participants and eligibility, 1<sup>st</sup> paragraph)

No specific criteria were applied for selection of peer counsellors and providers.

*Comments to the Author:*

The authors provide no information about the kind of questions or subject of the questions that were asked during the interview. As the interviews were semi-structured, I suppose some basic information could be provided. I found it difficult to interpret the results of the study, as I had no idea what kind of questions had been asked during the interview.

*Authors' reply:*

The themes of the interviews have already been described in the paper (in Methods section, Data collection process and ethical considerations, 2<sup>nd</sup> paragraph). If possible, the interview guide can also be made available as web appendix (please see below for more information on the interview guide).

In the paper, we have added that the interview guide is *obtainable from first author* (Methods section, Data collection process and ethical considerations, 2<sup>nd</sup> paragraph)

Questions included in the interview guide:

Three slightly different interview guides were used, one for interviews with providers, one with peer counsellors and one with patients. Examples of questions are given below (including some probing questions)

Interview with provider: Can you tell me about one patient you have met where you think you achieved a good adherence? Can you now tell me about one patient you have met where the adherence was not satisfactory? Could you tell me a bit more about your role as a staff in supporting adherence? How do you think the challenges can be overcome to improve adherence?

Interview with peer counsellor: Can you tell me about one patient you have met where you think you could contribute to achieve good adherence? Can you now tell me about one patient you have met where adherence remained unsatisfactory in spite of your contribution? Could you tell more about what you have learned from your contacts with patients about barriers to good adherence? How do you think it can be improved?



Interview with patient: How do you feel about taking medicines every day for a long time? What do you consider as most useful to enable you take the medicines in a correct way? What do you see as most difficult for you in taking the medicines in a correct way? What do people say about ARVs in your community? Does it affect you? Is there anything else you think should be improved regarding treatment of patients with HIV/AIDS?

*Comments to the Author:*

Little information is provided about the patients, staff members, and peer counsellors that participated in the study. In my opinion, providing more information about such as age, gender, duration of antiretroviral therapy, and travel distance to the clinics of the patients, and occupational background of the staff members that were interviewed would facilitate interpretation of the findings.

*Authors' reply:*

Information on time patients spent on travelling to the ART facilities and on patients' waiting time in the facility is now included: *Median travel time was 64 minutes (range 15-169) in Ethiopia, and 89 minutes (range 35-149) in Uganda, while waiting time in the facilities was 99 (range 35-284) and 182 (range 20-392) minutes, respectively.* (Methods section, Study context, 3<sup>rd</sup> paragraph)

Information on patients' age, gender and duration of antiretroviral therapy together with occupational background of providers' is added into the paper: *In Ethiopia, interviews were held with 38 patients (26 women and 12 men), 12 peer counsellors, four adherence nurses and professional counsellors, five medical doctors and seven pharmacists. The patients' median age was 36 years (range 24-58), and the mean duration of ART was 19 months (range 6 months-6 years). In Uganda, 41 patients (20 women and 21 men), five peer counsellors, two adherence nurses and professional counsellors, two clinical officers and two medical doctors were interviewed. The patients' median age was 35 years (range 26-53), and the mean duration of ART was 23 months (range 6 months-7 years).* (Methods section, Participants and eligibility, 2<sup>nd</sup> paragraph)

*Comments to the Author:*

The authors purposively recruited participants from clinics with a high, medium and low performance level of adherence, but they do not relate their findings to these levels. Were there any differences in study findings between patients and staff members from high and low adherence performance level clinics?

*Authors' reply:*

As mentioned above, the focus was on exploring views and experiences of adherence at an individual level rather than focusing on the differences between the facilities' performance levels. However, according to the reviewers' comments, we have revisited the material and some differences between the facilities were observed and

this information is now included in Methods: *The existence of a community network with support groups and community based volunteers, mediated by the facility's peer counsellors and providers and a well-organised record keeping system was a distinction between high- and low-performing facilities. Moreover, high performing facilities displayed a more clear concern among providers to build a committed team and a drive to improve the services.* (Methods section, Study context, 2<sup>nd</sup> paragraph)

We would also like to be explicit on that adherence challenges due to resource constraints were present in all 12 facilities by adding: *The providers' work situation and time for counselling had to be balanced against structural shortcomings in all facilities, irrespective of performance levels.* (Results section, Encounters influenced by structural factors, 2<sup>nd</sup> paragraph)

Referee: 2

*Comments to the Author:*

This study is a qualitative study conducted in ART facilities in Uganda and Ethiopia, in which patients, staff, and peer counsellors were interviewed regarding patients' experience with ART and patient/staff perceptions of adherence support. Overall, this study makes a good contribution to the literature in forwarding our understanding of the challenges involved in maintaining good long-term ART adherence in resource-limited settings. As a qualitative study, it compliments well the number of quantitative reports of ART adherence in multiple locales throughout sub-Saharan Africa. It also has the strength of interviewing both patients and health care staff, and asking questions in relating to experiences on both the individual and health-system level. As such, the lessons gleaned from the analysis lend themselves to suggest specific health-system interventions that could help to improve adherence. While the themes that emerged from the content analysis are familiar and have been frequently cited mostly anecdotally in relation to ART treatment in Africa, the systematic methodology of the paper helps to better elucidate and validate these themes.

It is apparent from the introduction that this study was undertaken in a subset of ART sites included in a broader study of adherence (INRUD-IAA project). One confusion I had regarded the sampling and characteristics of the sites. In the 2nd paragraph of the methodology section, the lead sentence states that the study was conducted in 12 ART facilities, which is I assumed a subset of the 20 sites on which "indicators" were assessed and possibly were included in the INRUD-IAA project. The 3rd sentence, however, says that 6 facilities were chosen for the in-depth study. How this relates to the first sentence's "12 ART facilities" is unclear, unless they chose 6 in each country? I like the idea of stratification of sampling by adherence level (high, medium, and low), although a better definition of what adherence measurement they used for stratification purposes would be nice. And how many sites were in each of these categories to choose from? Finally, how were the final 6 (or 12?) sites eventually chosen, within these 2 countries and 3 levels of adherence? By convenience, random selection, further stratification into urban/rural, or another method? Finally, a better description of the actual sites chosen for inclusion would be helpful, for example: how large were they? How many patients did they enrol/see per day? How many were on ART? How many staff did they have (and what was their workload)? Did they have frequent stock-outs of ART? Perhaps even a table may be useful. This information would help to better understand the applicability of the results to other sites in Africa, and also to have a better quantitative characterization of the sites as the results brought up (not surprisingly) heavy

staff workload and ART stock-outs as issues affecting adherence.

*Authors' reply:* Six facilities were chosen in each of Ethiopia and Uganda which is now written more clearly in the paper *Six facilities in each country were chosen for this more in-depth study, two from each performance level* (Methods section, Study context, 2<sup>nd</sup> paragraph). For a description of adherence measurements/indicators for facility performance, please see our reply to the first comment by Referee 1 (page 1).

In the first phase of the INRUD-IAA project work, only those facilities treating at least 100 patients with ART were chosen (based on data from National AIDS Control Program). Purposeful sampling was then applied, aiming at variation, thus incorporating different geographical regions, different levels of care and different programs. We have added *purposefully selected* and *according to defined indicators* (Methods section, Study context, 2<sup>nd</sup> paragraph) to clarify the sampling strategy. The facilities were ranked according to their performance level (see our reply to Referee 1, page 1), and the two facilities from each performance level were selected based on what was perceived as geographically accessible for the research team.

A better description of patient load and human resources in the 12 facilities chosen for inclusion is now complemented both in text: *Patient load per week ranged between 175 and 750 in Ethiopia, and between 105 and 2045 in Uganda.* and referred to in more detail in Table 1: *Patient load and human resources per facility is shown in table 1.* (Methods section, Study context)

*Comments to the author:*

Secondly, further explanation of the sampling of participants within the sites would be helpful. How were the participants chosen from among the many at the clinic? Was any measure of adherence used to select the patients that were interviewed? And were all of the interviews individual, or were there also focus groups? There is also mention of the “minimum” number of interviews planned, but the actual number seems to greatly exceed this. What influenced the number of interviewees that were ultimately done? The results mention “saturation” which is a reasonable approach, but then this should be mentioned.

With regard to the content of the interviews, this is relatively well explained in the “Data collection process and ethical considerations” section (page 5). I only wonder whether questions or probes were also used to better understand why there may have been differences in site-level adherence, which was after all used to stratify the sites prior to sampling.

*Authors' reply:*

Clarifications of selection process and selection criteria of participants are added into the paper as previously mentioned (Methods section, Participants and eligibility, 1<sup>st</sup> paragraph). No measure of adherence was used in the selection of patients. All in-depth interviews were semi-structured and individual as stated in Methods section, Data collection process and ethical considerations, 1<sup>st</sup> paragraph. The planned “minimum” number of interviews was used as a “working hypothesis” in the early planning stage. However, the interviews with patients were conducted until saturation was reached, and to avoid confusion we have removed the sentence on “minimum” interviews from the paper and added the following: *While interviews with patients continued until saturation was reached, saturation of interview data*

*from peer counsellors and providers was not fully achieved in facilities where their number and availability was limited.* (Methods section, Data collection process and ethical considerations, 1<sup>st</sup> paragraph)

The probing was not focused on the site-level of performance; instead it centred on the patients' individual experiences.

*Comments to the author:*

In the results section, the identification of 2 themes is discussed with detail. However, while reading I was wondering whether additional themes also emerged that were not discussed, since only 2 themes seems like a relatively restricted number from such open-ended questioning. Indeed, in the "Methodological considerations" (page 15), it seemed clear that other themes did in fact come up that were not discussed, making me wonder why and what else we were missing. It may be worthwhile to add detail at the beginning of the results, explaining that these were the 2 themes (and not the only themes) that were identified, and why they were chosen for the focus of this paper.

*Authors' reply:*

In order to describe our findings more in-depth we chose to exclude the third theme and categories which also emerged from the analysis: Patients' family and community support in relation to stigma, discrimination and disclosure of HIV status. These will instead be documented in a forthcoming article (in manuscript). The themes in this article were chosen since they constitute the more explicit prerequisites for patients' adherence. If the editor allows for additional words we can include the following in Results: *A third theme "Family and community support in relation to stigma, discrimination and disclosure of HIV status" also emerged from the analysis. However, to allow for an in-depth account of the first two themes, which deal with adherence more explicitly, the third theme will be described in a forthcoming paper.*

*Comments to the author:*

In terms of the 2 themes that were presented, I did occasionally struggle to see how the issues lumped together under these themes fit together. The major issue was that the titles of the themes were patient-based, but the discussions often centered on patient-system interactions. For example, in the 1st theme (patients' competing costs), I'm not sure that the "system level" frustrations voiced by staff related to limited resources, ART stock-outs, and high work-loads (p.8/9) fits cleanly with the competing needs of patients, other than for its consequence that patients had to return again and again and hence be burdened further with transportation and OI treatment costs (and frustration/developing a lack of trust, which may fit better under the 2nd theme). But the "system level" inefficiencies also seem to be a bit separate, perhaps fitting together with patients' competing costs by their similarity in trying to function in a setting with very limited resources (both among patients and the health system itself), rather than just with the limited resources/competing needs of patients. This slightly differently-framed "theme", emphasizing the relationship between the patients and the system, is also evident in the examples cited of how system inefficiencies (not being open every day, giving out only 2 weeks of drugs, p.8) compounds the problem, and in the example of where the system was able to help with the competing needs of a patient who needed food

(peer counsellor example, p.8). It also comes through in the solution of decentralized home-based care presented in the discussion section (p.13), where again resource-constraints in the system may make such a solution unsustainable. Emphasizing system-level problems and their relationship to patients is critical to define appropriate solutions, and is an excellent contribution of this paper. However, perhaps this relationship could be better framed in the context of the single theme under which it is presented, or separated into smaller themes.

*Authors' reply:*

We have redefined the titles of the two themes to better capture the challenges in patient-system interactions and to emphasize the system level issues more. The new titles are: *Patients' competing costs and systems' resource constraints* (Results section, 1<sup>st</sup> theme) and *Patients' trust in ART and quality of the patient-provider encounters* (Results section, 2<sup>nd</sup> theme). The theme titles have also been changed in the Abstract.

As suggested by the reviewer, each theme is now separated into two categories. We have also added an introduction to each theme that briefly summarizes the core content of the theme.

Introduction to theme 1: *This theme describes factors related to economic resources both on an individual level and system level.* (Results section, 1<sup>st</sup> theme)

The categories of the 1<sup>st</sup> theme are *Patients' financial struggles with ART related costs* and *Health systems' resource constraints*

Please see reply below on the 2<sup>nd</sup> theme (page 8).

*Comments to the author:*

The issues presented under the 2nd theme (patients' trust and understanding of ART) were also initially difficult to understand grouped together, and perhaps because of a similar issue as above. In the discussion of ADRs, perhaps this is presented under the topic of "trust/understanding of ART" because experience or fear of ADRs created a lack of "trust in ART" on the part patients—if this is indeed true it could be more explicitly stated, rather than simply that "ADRs were severely challenging with respect to adherence" (p.10). But then the discussion invariably turned to problems related to the health staff's understanding of patients' perspectives (staff was "ignorant of problems in relation to ADRs", p.11), high staff workload and low staff support leading to insufficient counselling (p.11/12), and problematic staff-patient interactions (p.12). Again, the presumption that I could not find explicitly stated is that these staffing/system-level problems ultimately lead to a lack of "trust/understanding" on the part of the patients, and therefore exacerbate poor adherence. While true, I wonder if there are several issues here, relating ultimately to the relationship between patients and staff/health systems that do not fit cleanly under the heading "[patients'] trust and understanding of ART" as the theme is called. Again, perhaps redefining the theme, or separating out the system and patient-level perceptions, would help to improve the organization and flow of the ideas presented.

*Authors' reply:*

We found that an interaction based on trust between patients and providers was essential for a successful adherence. When providers' receptiveness were perceived as

inefficient/poor by the patients, they lost their trust in ART which inevitably challenged adherence. We agree that this needs to be stated more clearly in the paper and have added: *While an interaction based on trust between patients and providers was expressed as essential for a successful adherence, the patients could easily lose their trust in the ART if they felt that the providers did not take their concerns seriously.* (Results section, Motivation and trust mediated in patient-provider encounters, 3<sup>rd</sup> paragraph)

We agree that a clarification of the interrelationships between patient and provider and peer counsellors is needed.

An introduction to the 2<sup>nd</sup> theme is added: *This theme describes how the providers' and peer counsellors' reception and counselling skills influenced patients' adherence. It also shows that the counselling was embedded in a context where not only patients but also providers and peer counsellors faced structural limitations.* (Results section, 2<sup>nd</sup> theme)

The categories of the 2<sup>nd</sup> theme are *Motivation and trust mediated in patient-provider encounters* and *Encounters influenced by structural factors*

*Comments to the author:*

Another general comment of the results section that follows from the discussion above, is that it may be helpful (although not necessary) to better separate staff/counsellor perspectives from patient perspectives. Often times these are interwoven and difficult to follow. I think the results are very enlightening particularly around how the staff/counsellor perspectives differ from patients, for example around competing needs and ADRs; however, it is often difficult to see the differences and similarities of these perspectives from the way things are presented, essentially going back-and-forth between the two.

*Authors' reply:*

Thank you for your positive comment on our results. We have gathered the responses on ADRs and the importance of trust into one paragraph (Results section, Motivation and trust mediated in patient-provider encounters, 3<sup>rd</sup> paragraph) to make it easier to follow, although we have still chosen to go back and forth between the two perspectives in order to illustrate the patient-system dynamics of the ongoing process.

*Comments to the author:*

Regarding the discussion, this is generally well presented, understandable, and flows from the details of the results. The organization, however, does not seem to mimic the presentation within the results section, as confined to the 2 themes presented in the results. Again, perhaps broadening the definition of the 2 themes themselves—to focus on patient-system relationships which the discussion often does nicely—or separating the themes into more smaller themes, would be helpful.

*Authors' reply:*

We believe that the discussion is now more in line with the presentation of results after changing the titles of the themes, organizing them into categories and giving an introduction to each of them.

*Comments to the author:*

Regarding the "Methodological considerations" section (page 15), mention is made that themes were similar between the 2 countries and varying with different levels of adherence. However, it may be good to present this in the results section perhaps with more detail, particularly because the stratification of sampling based on good/poor adhering sites makes one initially think that understanding differences may have been a focus of the paper. I am also confused about the language of the second sentence in paragraph 2 of "Methodological considerations" ("However, all the facilities performed well in several aspects"). What does "performed well" mean? And what are the "discernable" differences?

Other comments on "Methodological considerations": Additional description of sampling in the methodology section (as discussed above) would help complement paragraph 1. Additional description on other themes identified and not presented in this paper (mentioned in paragraph 3) would be of benefit in the results section.

*Authors' reply:*

Information on general features of well functioning facilities that may influence adherence positively has been added as the last paragraph in the Methods section, Study context, 2<sup>nd</sup> paragraph. Please see authors' earlier reply to the last comment by Referee 1.

As mentioned previously, additional description on the sampling has now been included in the Methods section, Participants and eligibility.

To avoid duplication of information we have removed the following sentences from Methodological considerations: *However, all the facilities performed well in several aspects and the differences, although discernible, were often quite small. We also chose to exclude the sentence on the third theme to avoid confusion on further findings not described in this article Also, in order to describe our findings in more depth in this paper, we excluded some other facilitators for and challenges to patients' adherence, which also emerged from the content analysis. These determinants of adherence were related to patient support, documented in a second article from the INRUD-IAA study.*

*Additional comments from authors:*

To comply with the required limit of 3000 words we have exchanged the frequently used term "members of staff" into "providers", removed parts of or entire quotes from the interviews, and reduced the number of words in several sentences without losing the content.

We have also excluded the following larger sections of text:

*Factors associated with ART adherence include patient characteristics, socioeconomic factors, treatment regimens, disease characteristics, patient-care provider relationships and clinical settings (Singh, Squier, Sivek, Wagener, Nguyen & Yu, 1996; Paterson et al., 2000; Altice, Mostashari & Friedland, 2001; Ickovics & Meade, 2002; Mills et al., 2006). (Introduction, 2<sup>nd</sup> paragraph)*

and

*Considering that the majority of HIV/AIDS patients live in these low-income countries and constitute a growing population, research on factors important for patients' adherence is required (Mills et al., 2006). (Introduction, 2<sup>nd</sup> paragraph)*

and

*Another recurring reason for stopping ART that providers had observed was the initial improvement in health status, misleading patients into believing that the virus had disappeared.*

*The next time, he came and we asked him whether he was taking his drugs and said "No, I stopped because I am now fine". Then we told him that he was supposed to take the drugs for life. He said "I think I am fine, I don't need your drugs". [Clinical officer, Uganda] (Results section, Motivation and trust mediated in patient-provider encounters, last paragraph)*

We have also made slight changes in the formulation of the Conclusions, which now read:

*When structural and individual challenges were too overwhelming, continuing ART was not perceived as an option by patients. To give patients a fair choice to successfully adhere to ART, transport costs to facilities need to be reduced, by providing patients with drugs for longer periods of time and making arrangements for better laboratory services. Services ought to be brought closer to patients and peripheral community-based healthworkers used for drug distribution. There is a need for training providers and peer counsellors in communication skills and adherence counselling.*

Consequent changes have been made in the abstract.