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A Fluctuating Pattern of Over- and Under-Adherence for HAART: A Case Study from a Videophone Intervention Project

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Abstract

Highly Active Antiretroviral Therapy (HAART) has transformed HIV from a terminal illness to a chronic condition. While disagreement remains regarding the level of medication adherence required to achieve and maintain viral suppression, the highest possible rate is preferable. This article discusses the case study of “Bob,” a 54 year-old man living with HIV for 25 years. At baseline, Bob evinced fluctuating patterns of medication over- and under-adherence and reported numerous negative side effects. Bob participated in eight videophone-administered adherence intervention sessions. His adherence improved to a high of 97.9% at one-month follow-up; his negative treatment side effects subsided considerably. This case study demonstrates that videophone technology is a potential medium by which to assess and intervene upon HIV medication adherence.

Keywords

HIV/AIDS; medication adherence; videophones

Improved clinical care and Highly Active Antiretroviral Therapy (HAART) are enabling persons with HIV/AIDS to live longer and healthier lives. Despite disagreement regarding levels of medication adherence requisite for successful viral suppression (Paterson et al., 2000; Bangsberg et al., 2001; Bangsberg & Deeks, 2002; Bangsberg, Moss, & Deeks, 2004; Weiser, Guzman, Riley, Clark, & Bangsberg, 2004; Bangsberg, 2006), consistent adherence to HIV medication regimens is still recommended. To illustrate that adherence to HIV medications can be a highly complex process, this report describes fluctuating patterns of medication over-use and under-use in a 54 year-old male living with HIV/AIDS. This report also discusses the utility of videophones to deliver and assess the efficacy of an intervention to improve medication adherence.

Although little research has examined the use of videophones to improve medication adherence, telephone-based interventions have produced increases in HIV medication adherence (Collier et al., 2005; Reynolds et al., 2008). Moreover, videophone-based interventions have been used with cognitively impaired older adults (Sävenstedt, Zingmark, & Sandman, 2003), and many persons living with HIV/AIDS are likely to manifest cognitive and neuropsychiatric compromise.

Medication adherence is typically assessed outside of clinical settings through two assessment methodologies: (1) in-person pill counts; and (2) telephone-based unannounced pill counts. In-person pill counts (Bangsberg, Hecht, Charlebois, Chesney, & Moss, 2001) provide researchers with an accurate measure of adherence; however, such pill counts may only be feasible in large cities or in group home settings, where there is a high density of participants in one area. The use of unannounced in-person pill counts in rural areas is cost-prohibitive, both in terms of time and travel expenses.

Unannounced telephone-based pill counts (Kalichman et al., 2007) provide a feasible method of assessing adherence—even in rural areas—and are less expensive than in-person pill counts. This method, however, relies upon participants providing accurate and truthful pill counts and there is no way to verify visually one's pill count. This can be problematic, particularly if the participant has a cognitive impairment or is prone to social desirability. In the current study, we hypothesized that videophone-based pill counts could be a well-accepted compromise between in-person pill counts and telephone-based pill counts.

The person described in this case report participated in the formative phase of an ongoing study that is testing if a cognitive-psychosocial intervention administered via videophone can increase medication adherence in persons living with HIV/AIDS. The intervention under evaluation in this phase of the study is Reynolds' HAART Care (HC). In Reynolds' multicenter AIDS Clinical Trial Group (ACTG) study (Reynolds et al., 2008), HC sessions were delivered via regular telephone once per week for 12 weeks and then once every other week for four weeks (for a total of 14 sessions). As modified for the current project, participants were asked to take part in 8 intervention sessions—twice per week for four weeks (See Table 1 for the points of contact with participants throughout the study.)

Case Report

To describe how the HC intervention was administered over the videophone, this case report presents the case of "Bob." Bob is a 54 year old African American male living in the Greater New York City Area. He has been living with HIV for approximately 25 years. Bob has an Associate's Degree and had worked most of his life as a salesman. At the time of his participation in this study, he was unemployed, and his annual income was less than \$12,000/year.

Bob showed evidence of cognitive impairment based on the Telephone Adaptation of the Modified Mini-Mental Status Examination (68 out of 100; Norton et al., 1999) and the Semantic Fluency Test (1.94 standard deviations below the mean for his education/age group; Brickman et al., 2005).

When combining his HIV and non-HIV medications, Bob was taking more than 15 pills per day. For his HIV infection, he took Kaletra twice per day (6:00am and 6:00pm) and Truvada once per day (6:00pm). His self-reported adherence rate for these two medications was 75% at the initial screening interview. (See Table 2 for Bob's self-reported medication adherence rates at other points prior to treatment.) Bob endorsed 12 of 13 possible reasons for missing medications, including: being away from home, simply forgetting, falling asleep/sleeping through a dose, feeling depressed/overwhelmed, having problems taking pills at specified

times, and wanting to avoid side effects. In terms of medication side effects, Bob reported experiencing “significant” problems with diarrhea, insomnia, abdominal pain, dry mouth, and dry heaves. He reported “moderate” problems with nausea, rash, and neuropathy. Bob also reported being resistant to 12 HIV medications.

Two videophone-based pill counts of Bob’s “anchor” medication—that is, the medication with the most complex regimen (Kaletra)—were conducted one week apart prior to the intervention. The two pill counts revealed a baseline adherence rate of 125%; Bob had taken *too many pills* during the previous week. This is consistent with Bob’s statement that he was sometimes uncertain whether he took his pills or not...so he took them again to be certain.

It is this tendency to both over- and under-medicate that has been an important finding of the current project. In fact, 59% of participants in the formative phase of this project were over-adherent at least once during their time in the study. Because patients are often provided with a one-month supply of medications, over-adherence portends that there will be at least one event of under-adherence before the next prescription is filled. If the only assessment of adherence is whether a prescription is filled each month, fluctuating patterns of over- and under-adherence would go undetected.

After completing two pills counts, Bob entered the intervention phase of the study. The major activities of each intervention session are now described.

Intervention Session #1 (45 minutes)

The interventionist provided the following account of Session #1:

Bob and I established videophone contact immediately. He was verbal in answering questions and expressing his feelings concerning his HIV infection and the challenge of adherence.

Bob felt as though he was receiving a real one-to-one counseling session and almost forgot that we were not sitting in the same room together. The videophone enabled us to form a working relationship immediately because we were face-to-face and yet he always knew that he was in his own home, which made it easier for him to talk and to be himself.

After exploring many possible barriers to adherence, we jointly decided to work on: (1) remembering his regimen; and (2) reducing medication-related side effects. His gastrointestinal side effects were so severe that they prevented him from eating and enjoying food. He took so many medications that he simply could not remember whether or not he took his pills as prescribed. When he couldn’t recall taking a pill, he just took his pills again. His non-adherence swung from taking too few pills to taking too many.

Intervention Session #2 (25 minutes - 3 days later)

During Session #2, Bob indicated that he was not eating food prior to taking his medications, partially due to the fact that, when he did try to eat food, he experienced severe GI problems. To help ensure that Bob would eat an easily-digestible food prior to taking his medications, the interventionist recommended that he purchase a fruit “juicer.” The interventionist then discussed Bob’s apparent problem with over-adherence. The interventionist recommended that Bob use a pill checklist. Bob was to put an “X” next to the name of the medication after taking it each day.

Intervention Session #3 (15 minutes - 4 days later)

During Session #3, the interventionist showed Bob a draft of a pill checklist over the videophone and explained how it would be used. Bob had not yet obtained a juicer, but his brother had recently purchased one and was planning to bring it to Bob's house later that day.

Intervention Session #4 (20 minutes - 3 days later)

By this time, Bob had already starting using his juicer. He had also received the pill checklist created and mailed to him by the interventionist. They reviewed how Bob would use the checklist. Bob agreed to start using it at the beginning of the next week.

Intervention Session #5 (30 minutes - 4 days later)

The HC intervention protocol for Session #5 called for the interventionist to: (1) review and encourage follow-through with goals already selected; and (2) briefly discuss, for a second time, other possible barriers to adherence that were discussed during Session #1. Bob reported that he was continuing to use the juicer and indicated that his negative side effects were beginning to diminish. During this session, he was happy to show the interventionist his checklist, which he had begun using regularly earlier that week.

During this session, Bob also admitted he was having some issues with depression. To address his depression, they both agreed that it was important for Bob to take time to enjoy his hobbies and other activities that were not related to his HIV. The interventionist also encouraged Bob to use his social supports and perhaps attempt to expand his social support network.

Intervention Session #6 (15 minutes - 2 days later)

During this session, the interventionist talked to Bob about how he would remember to take his pills and to take them with food over an upcoming holiday weekend.

Session #7 (15 minutes - 5 days later)

During this session, the interventionist continued to discuss and validate Bob's continued use of his juicer and medication checklist. Bob reported that the checklist, in particular, was very helpful.

Session #8 (20 minutes - 3 days later)

In the final session, the interventionist reiterated the importance of consistent adherence (i.e., avoiding under- and over-adherence). She reviewed Bob's two main goals--the use of a juicer (to help decrease side effects) and the checklist (to track general adherence and to safeguard against over-adherence). She then "validated his improvement and re-enforced continuous adherence."

In total, Bob participated in eight intervention sessions over the course of 24 days. The mean session length was 23 minutes.

Bob's videophone-based pill count adherence rate improved from approximately 75% prior to the intervention to 94.4% at 1-week follow-up interview. At one-month follow-up, Bob's adherence was 97.9%; however, his adherence rate dropped to approximately 80% at 2- and 3-month follow-up. Booster sessions are now being used as-needed to maintain the initial promising results of the intervention. Also, at 3-month follow-up, Bob reported that many of his side effects had subsided. In fact, he reported having no GI difficulties at all.

Discussion

This case study highlights the potential utility of videophones and similar technologies (e.g., web-based video conferencing) in medication adherence research. Videophone-based pill counts may be feasible and well-accepted alternatives to other assessment methodologies used to monitor HIV medication adherence. During this study, our team has identified that many persons living with HIV/AIDS prefer *not* to have researchers visit them in their homes to conduct pill counts. In fact, more than 50% of study participants refused to be visited for in-person pill counts. Our team has also been able to validate the accuracy of our videophone-based pill counts in a sub-sample of urban community dwellers, using in-person announced pill counts in conjunction with unannounced videophone-based pill counts. In our initial pilot work, results from four in-person unannounced pill counts matched *exactly* the results of videophone-based pill counts, which had been conducted just minutes earlier, with the exception of one pill count that was off by one pill—45 anchor medication pills versus 44.

Participants also seem to enjoy “in-person” interactions with their interventionists during videophone sessions and have expressed an appreciation for being able to conduct sessions in the comfort of their own homes. This is an improvement over in-person clinic-based interventions and interventions delivered over standard telephone technology. Also, because our interventionists are providing the same help they normally provide in clinic settings in a face-to-face format, we have demonstrated the feasibility of providing effective interventions by professionals via videophone technology. Furthermore, our results have implications for the treatment of other chronic conditions seen in geriatric populations, such as diabetes, arthritis, and COPD. Finally, because persons can remain in the privacy and comfort of one’s home, the intervention has a unique potential to benefit diverse populations, including those with physical disabilities, as well as gay, lesbian, bisexual, and transgender persons. In fact, 26% of persons administered the intervention to date were gay, lesbian, bisexual, or transgender.

While the videophone-delivered HC intervention seemed to have a positive impact upon Bob’s medication adherence, the case study has several limitations. First, the apparent success of the HC intervention for one participant does not guarantee the success of the intervention for others. However, it should be noted that Bob was one of 23 participants who completed the “formative” phase of an NIMH-funded exploratory research project called Project ASPIRE. The results of the formative phase of Project ASPIRE, which have been published elsewhere (Skrajner, Camp, Haberman, Heckman, Kochman, & Frentiu, 2010), are promising. A significant increase in self-reported adherence from baseline to post-treatment was observed; videophone-based pill count adherence rates also increased, but not significantly. A small-scale randomized control trial is currently underway, which will help us to determine whether the same trends in adherence are observed, and to detect parameters associated with positive responses to the intervention. Second, in order to take part in the study, persons needed to have access to an analog phone line. Therefore, persons with only cell phones and/or digital phone lines were unable to take part in the study. In future studies, we plan to utilize a different video technology to reach more participants (e.g., laptops and internet access to participants and use a web-based video conferencing service). Third, in order to benefit from the intervention, persons had to be willing to use a relatively new and unfamiliar technology. In the current study, participants self-referred for the study; hence, persons contacted researchers only if they were willing to use videophones. It is likely that there were some persons who decided not to self-refer, due to the requirement of using videophones in the study. For such persons, telephone-delivered interventions, or traditional clinic-based interventions, could be alternative options. (As mentioned earlier, the HC intervention was originally developed for use via regular telephone, and it could easily be

adapted for use in a clinic setting.) Fourth, biologic data (e.g., HIV viral load and CD4 cell counts) were not collected in this study. Since HIV adherence interventions ultimately aim to intervene upon the overall health of persons with dementia, we plan to collect such data in future studies.

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References

- Bangsberg DR. Less than 95% adherence to nonnucleoside reverse transcriptase inhibitor therapy can lead to viral suppression. *Clinical Infectious Diseases*. 2006; 43(7):939–941. [PubMed: 16941380]
- Bangsberg DR, Deeks SG. Is average adherence to HIV antiretroviral therapy enough? *Journal of General Internal Medicine*. 2002; 17(10):812–813. [PubMed: 12390559]
- Bangsberg DR, Hecht FM, Charlebois ED, Chesney M, Moss A. Comparing objective measures of adherence to HIV antiretroviral therapy: Electronic medication monitors and unannounced pill counts. *AIDS and Behavior*. 2001; 5(3):275–281.
- Bangsberg DR, Moss AR, Deeks SG. Paradoxes of adherence and drug resistance to HIV antiretroviral therapy. *Journal of Antimicrobial Chemotherapy*. 2004; 53(5):696–699. [PubMed: 15044425]
- Bangsberg DR, Perry S, Charlebois ED, Clark RA, Roberston M, Zolopa AR, Moss A. Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. *AIDS*. 2001; 15(9):1181–1183. [PubMed: 11416722]
- Brickman AM, Paul RH, Cohen RA, Williams LM, MacGregor KL, Jefferson AL, Gordon E. Category and letter verbal fluency across the adult lifespan: Relationship to EEG theta power. *Archives of Clinical Neuropsychology*. 2005; 20:561–573. [PubMed: 15939182]
- Collier AC, Ribaud H, Mukherjee AL, Feinberg J, Fischl MA, Chesney M. the Adult AIDS Clinical Trials Group 746 Study Team. A randomized study of serial telephone call support to increase adherence and thereby improve virologic outcome in persons initiating antiretroviral therapy. *Journal of Infectious Diseases*. 2005; 15:1398–1406. [PubMed: 16170757]
- Kalichman SC, Amaral CM, Stearns H, White D, Flanagan J, Pope H, Kalichman MO. Adherence to antiretroviral therapy assessed by unannounced pill counts conducted by telephone. *Journal of General Internal Medicine*. 2007; 22(7):1003–1006. [PubMed: 17390095]
- Norton MC, Tschanz JAT, Fan X, Plassman BL, Welsh-Bohmer KA, West N, Breitner JCS. Telephone adaptation of the Modified Mini-Mental State Exam (3MS). The Cache County Study. *Neuropsychiatry, Neuropsychology, & Behavioral Neurology*. 1999; 12(4):270–276.
- Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C, Singh N. Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Annals of Internal Medicine*. 2000; 133(1):21–30. [PubMed: 10877736]
- Reynolds NR, Testa MA, Su M, Chesney MA, Neidig JL, Frank I. the AIDS Clinical Trials Groups 731 and 384 Teams. Telephone support to improve antiretroviral medication adherence: A multisite, randomized controlled trial. *Journal of Acquired Immune Deficiency Syndromes*. 2008; 47(1):62–68. [PubMed: 17891043]
- Sävenstedt S, Zingmark K, Sandman PO. Video-phone communication with cognitively impaired elderly patients. *Journal of Telemedicine and Telecare*. 2003; 9:52–54.
- Skrajner MJ, Camp CJ, Haberman JL, Heckman TG, Kochman A, Frentiu C. Use of videophone technology to address medication adherence issues in persons with HIV. *HIV/AIDS-Research and Palliative Care*. 2010; 1:23–30.
- Weiser SD, Guzman D, Riley ED, Clark R, Bangsberg DR. Higher rates of viral suppression with nonnucleoside reverse transcriptase inhibitors compared to single protease inhibitors are not explained by better adherence. *HIV Clinical Trials*. 2004; 5(5):278–287. [PubMed: 15562368]