

CARE+ User Study: Usability and Attitudes Towards a Tablet PC Computer Counseling Tool for HIV+ Men and Women

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Abstract

CARE+ is a tablet PC-based computer counseling tool designed to support medication adherence and secondary HIV prevention for people living with HIV. Thirty HIV+ men and women participated in our user study to assess usability and attitudes towards CARE+. We observed them using CARE+ for the first time and conducted a semi-structured interview afterwards. Our findings suggest computer counseling may reduce social bias and encourage participants to answer questions honestly. Participants felt that discussing sensitive subjects with a computer instead of a person reduced feelings of embarrassment and being judged, and promoted privacy. Results also confirm that potential users think computers can provide helpful counseling, and that many also want human counseling interaction. Our study also revealed that tablet PC-based applications are usable by our population of mixed experience computer users. Computer counseling holds great potential for providing assessment and health promotion to individuals with chronic conditions such as HIV.

Keywords

Human-computer interaction, Improving health care outcomes, HIV, User study, Usability, Tablet PC, Honesty, Computer counseling, Adherence

Introduction

Computer Assessment & Rx Education for HIV-positives (CARE+) is a computer counseling tool for people living with HIV. The goal of this tablet PC-based program is to improve antiretroviral therapy (ART) adherence and to lower risk of secondary HIV infection. In this paper we discuss a user study conducted to assess the usability of CARE+ and assess participants' attitudes towards computer-assisted counseling. The results of this study inform technology development for HIV-positive individuals, and present findings on the potential benefits and drawbacks of using technology for risk assessment and counseling.

CARE+ uses a behavioral theoretical framework that includes Information-Motivation-Behavior [1], social cognitive role-modeling [2], and motivational

interviewing [3]. Users begin the computer counseling session by answering tailored risk assessment questions about social support; sexual behaviors; substance use; mental health; medication regimens, adherence, and side effects; and provider relationships. CARE+ provides personalized feedback by identifying areas in which the individual has reported having trouble, and identifies at least one area where they are doing well. One relevant skill-building video is shown to participants automatically; then participants can choose to view additional videos. The last step in CARE+ guides users through creating a risk reduction plan focused on either ART adherence or reducing their risk of secondary HIV infection (see Figure 1). CARE+ is intended to be used in a clinic prior to meeting with a health provider, and users receive a printout of their plan to keep and/or to discuss with their provider if they choose. The interface for CARE+ is based on one developed for CARE, an application for risk assessment and plan development with people at risk of sexually transmitted infections.[4] CARE+ is a .NET application delivered on a tablet PC with a SQL backend.

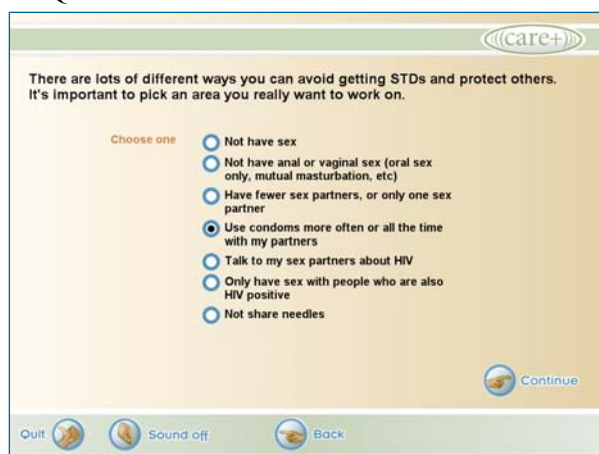


Figure 1: Screenshot of plan section of CARE+

Previous Work

Few studies have been conducted with patients using tablet PCs. A recent study showed that patients were generally positive about using tablet computers and were willing and able to use them to fill out a survey of demographic information and information about

their home life.[5] Unfortunately the assessment of this tool was limited to a 1-2 minute interview so we cannot gain deep insight into participants' attitudes towards using a tablet PC for demographic questions.

Another area in which computers are being used with diverse and underserved populations is in risk assessment (often for public health purposes). One such study used a touch screen computer to do risk assessment with participants with alcohol-related problems. A questionnaire was used to determine that most people felt comfortable about using the computer. However, some reported concern about confidentiality.[6] Risk assessments done in several settings with computers and with audio-assisted self-interviewing have been shown to be acceptable to people, including those with little computer experience, and to provide higher reports of sensitive behaviors than face-to-face risk assessment.[7-9] The quantitative nature of these studies helps to show a clear difference in honesty between computer-interviewing and face to face interviewing, but has limitations in providing reasons for this honesty. Our study was qualitative and provides some reasons why people may be more honest with a computer. We also report our findings about participants' ability to use a tablet computer for behavioral counseling. Our qualitative observations of their use of the tablet PC can inform other tablet-based tools for inexperienced computer users.

Methods

Our user study included 30 people living with HIV recruited from two locations: an HIV clinic and a community-based HIV organization. The user study included an initial session that lasted approximately 90 minutes, and a follow-up session one week later that lasted 20-30 minutes. During the first session we administered a questionnaire to collect demographic and background information, and we observed participants using CARE+ for the first time. Then we conducted a semi-structured interview to identify usability issues and also assess participants' views on computer counseling. These sessions took place in two locations: a private office at one location and a private meeting room in the second location. A portable usability lab was used to record screen capture, video, and audio of each session. The follow-up session took place in a waiting room or office and was for test-retest reliability of the CARE+ questionnaire; it is not a focus of this paper.

During the initial session each participant was asked to use CARE+ and answer the questions honestly for themselves. The researcher started the program and handed the stylus to the participant. The program begins with a brief explanation of how to navigate

through CARE+. Then each individual completed the risk assessment, feedback, videos, and plan sections. Researchers observed participants and took field notes on usability issues and problems participants brought up. Participants were encouraged to "try whatever your first instinct is" if they got stuck. This encouragement was purposefully vague to give researchers the opportunity to observe how participants worked through points of uncertainty. Researchers did not instruct participants on how to use the interface or the tablet PC.

The semi-structured interview was conducted using an interview guide, which outlined topics to discuss and suggested probing questions. Participants were first asked how using the tool was for them in order to capture their initial reactions to CARE+. We then asked participants to identify the best and worst parts of using the tool, which was useful in revealing usability issues with the interface and with the tablet PC. To assess participants' attitudes about using a computer counseling tool we asked them to tell us about "the difference between doing this with a computer versus with a person." We probed further by asking them to identify benefits and drawbacks of using a computer and of talking to a person. Our methodology was qualitative and our questions were purposefully open ended in order to describe the breadth of participants' views on CARE+.

Two researchers analyzed the transcribed interviews by consensus, using affinity diagramming. This method involves isolating individual comments or ideas on note cards and sorting the note cards into categories representing themes in the data.[10] Affinity diagramming is an approach that allows themes to emerge from the data, as opposed to coding data with pre-defined categories.

Results

The initial questionnaire revealed our participants had varying levels of education and computer experience. Ten of our 30 participants reported their highest level of education to be middle school or high school. Another 15 people reported having some college, and four people reported graduating from college. One person reported having a masters degree or higher. Our participants also had highly varied levels of computer experience. Table 1 shows that seven of the 30 participants reported having used a computer a few times or never. Eleven participants were experienced users who reported using a computer several hours most days.

Tablet PC Usability

All 30 participants were able to complete the CARE+ program, although only five of our thirty participants

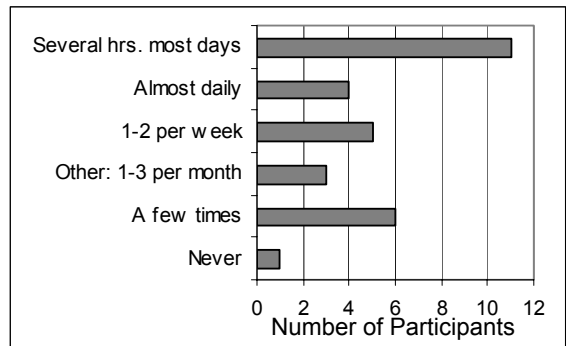
reported using a tablet computer at least once before. Following their session with CARE+, many participants made positive comments about using the tablet PC. Right after the interview, or when discussing their favorite parts of using CARE+, several participants said things like, “fun,” “cool,” and “cute” to describe the computer. When asked how using the tool was for her, one participant said, “I enjoyed it. At first I was a little bit afraid but, because I wasn’t familiar with it, but once I got on to it, it was fun, I like it.”

By observing participants while they used CARE+ for the first time and then interviewing them, we were able to identify a few factors that should be considered when developing a tablet PC application for this population. The three main issues we identified were issues with seeing the screen, difficulties tapping, and a few difficulties with target acquisition. People taking HIV medications frequently have eyesight impairment and some people brought up that the tablet PC screen was a little difficult for them to see with the lighting in the room. This was an issue both in the office that had a large window and also in the second location, which had florescent lighting. Participants found angling the screen to prevent reflection improved their ability to see the interface. This factor should be considered when designing applications for this population and we would recommend large text and high contrast in the interface.

A few participants mentioned target size as another issue with the computer. Several of the CARE+ screens have radio buttons (see Figure 1) and a few participants had some difficulty selecting the intended button. This could be improved by slightly larger targets with more space around them. Another issue observers noticed, and a few participants mentioned, is that tapping was not initially easy for several people. Many people began by pressing with the stylus, instead of tapping. The tablet PC does not respond to a press until the participant raises the stylus. Based on our observations, most participants quickly adapted to this mode of interaction and began tapping the screen. A few participants continued to have some trouble, although they were all able to answer the questions and navigate through the tool. During the interviews three participants mentioned that the pen did not respond as soon as you pressed.

With such a varied level of computer experience among participants we were encouraged to see every participant successfully complete CARE+ and were also encouraged by the positive comments many participants made about using the tool. One of their

Table 1: Participants’ Computer Experience



favorite aspects of using the tool was the stylus, or “the little pen.” Ten of our participants commented positively about using the stylus to tap the screen. Some people explained that it was easier than having to use a mouse or a keyboard –especially if you do not know how to type. A common adjective used to describe the pen was “easy.” These comments were made by both experienced and inexperienced computer users.

Attitudes towards CARE+

During the semi-structured interview, we gained insight into the benefits and drawbacks of counseling with a computer versus a person. We also gained insight into their opinions on counselors and their preference for a counselor or a computer. Participants brought up honesty, judgment, embarrassment, compassion, and trust. It is important to remember that the questions we posed to participants were general and intended to get them to compare using a computer and talking to a counselor about the same issues and topics; we did not ask them directly about any of the emotions or opinions discussed.

One of the themes in participants’ answers was honesty. Five of our participants specifically said that they were more honest with the computer. They mentioned that it can be hard to be honest with a counselor about illegal drug use and sexual practices. One participant said that with CARE+, “There’s not as much embarrassment, and I think it’s a little easier to be honest when you’re not looking somebody in the face.” In contrast, another participant also brought up honesty, but felt that it was easier to be dishonest when “you don’t have to look in someone’s eyes.”

The difficulty of talking about sensitive subjects with another person was frequently brought up. Topics participants mentioned as difficult to talk about were drug use, sexuality, sexual practices, and HIV status. A few people used the word “judged” to describe how they felt talking to a person. One person said a benefit of using the computer is, “Nonjudgmental. If you tell it something, like ‘I shot up five times today

before I came in,' it's not going to react." Another participant explained that a disadvantage of talking to a person is, "feeling like you are being judged," and went on to explain that this may make someone be less honest. A handful of participants also brought up embarrassment and said that one advantage of using the computer is that it is not embarrassing, but talking to a person is. A participant explained, "there's some embarrassment talking about these things."

Participants mentioned increased privacy as a benefit to using a computer. Often we are concerned with protecting electronic data to protect privacy, but these participants were saying that using a computer is more private than talking to a person. Specifically with sex and illegal drug use, three participants said using a computer provides "more privacy."

Other benefits to counseling with the computer, versus a person, mentioned by participants were accessibility and convenience. They envisioned using CARE+ in a clinic without needing an appointment, or at home. They also mentioned being able to go at your own pace and not taking up anyone's time as advantages to using the computer.

In addition to the positive aspects of using a computer, participants identified several things a computer simply cannot provide. A main advantage participants identified about counseling with humans is their ability to show caring and compassion. A participant explained that the computer can never reassuringly touch you on the shoulder. Another participant said, "Person to person offers compassion, and that's something you can't put into a computer program." "Knowing somebody cares" was important to participants and they felt that you could not get that from a computer. Participants said sympathy, empathy, and a sense of humor were advantages to a person. Two people also said that a person can relate to what they are going through.

The importance of human dialogue and interaction was brought up by several participants. With a computer you cannot explain your answers or "talk back." Also, you cannot ask clarifying questions about a word or medication with a computer. With a person you can clear up miscommunications or deviate from the topics the computer has programmed. A participant said with a counselor, "If you throw a curve ball at them, it's not one of the choices you know, they can operate with that." In contrast, a few people commented that with the computer you stay on topic and "get all the information."

Some participants discussed the importance of the relationship they developed over time with their

provider. With a person, "they know your background and they know where you're headed," and can focus on your goals. There were also participants who said that knowing and trusting the counselor was important. One said, "When I learn to trust someone I'm willing to accept their suggestions." Another explained that although he was "more truthful" with the computer, with a counselor "I think I felt more responsibility to take care of myself and this [the computer] is like a game, it's like 'ok, I'll use a condom.'" He said the accountability of discussing plans with his counselor was an important part of sticking to his plan.

Another theme that emerged from the interviews was that providers vary in quality. When asked about the advantages and disadvantages to talking to a person, one person said it "depends on the person...some are really good and some aren't." Participants pointed out that other people's level of comfort with HIV and sexuality can be hard to deal with. Other participants mentioned that sometimes people seem rushed or "sick of their job" and that is frustrating because sometimes they do not listen. One person said a good thing about a computer is, "this doesn't wake up and have a bad day." They spoke highly of providers who appear to have time to talk.

Participants identified specific times that they would definitely want to talk to a person. They emphasized that these are transient, but when depression is an issue and when their "stress level [is] high" they would want to see a person. In contrast, another participant said that sometimes he is "not feeling confident and strong" and that during those times he avoids talking to people, but would use a computer.

After participants compared counseling with a person and a computer, we asked them if they would choose a computer or a person for doing this same thing in the future. Fifteen participants chose a person and four chose a computer. Eight participants said either one, and two participants wanted to use the computer first and then talk to a person.

Discussion

Our study revealed that CARE+ delivered on a tablet PC was usable by both inexperienced and experienced computer users. We found that the vision issues experienced by some HIV+ participants on ART can make it difficult to see the computer screen and including large text and high contrast is important when developing tools for this population.

Understanding how our HIV+ participants feel about computer counseling is an important aspect of making good computer counseling tools. We confirmed that while this tool cannot replace an

excellent counselor, many individuals may find it useful in combination with a counselor and some may prefer it to talking to a human at times. We identified avoiding judgment, embarrassment and improved privacy as reasons individuals preferred using a computer when answering sensitive questions. Our results indicate that interacting with a computer can promote honesty from participants by reducing social bias. The implication of this finding is that computer counseling could enable an individual to be more honest about risky behavior and thus get relevant information and create a more realistic plan for changing their risky behavior.

Participants in our study were aware the computer was tailoring questions and feedback to the answers they provided, but also recognized they could not stray from the topics in the system. They also felt that a computer could not respond to them with empathy and compassion as a human would. In the next phase of CARE+ we have incorporated the use of avatars as guides through the system that will provide feedback to participants. A related project found using avatars to deliver tailored content for an exercise behavior change program resulted in people feeling a stronger bond to the program. This study did not address perceived empathy and compassion.[11] Work has also been done showing that people treat computers as social actors, suggesting that we apply social rules to our interactions with computers.[12] This work suggests that a participant who uses CARE+ with an avatar over time could develop a sense of accountability that some participants in our study said CARE+ lacked. This does not suggest that computers can replace counselors in fulfilling participants need for empathy and compassion from another human. It will be important to determine for whom and when these tools work best. Another intriguing issue for further study is: If a computer is viewed as a social actor, will it lose its ability to facilitate honesty by overcoming social bias?

Currently CARE+ is undergoing a longitudinal randomized controlled trial to establish its efficacy for improving ART adherence and reducing secondary HIV infection (n = 200 HIV+ adults).

Conclusion

Our study of CARE+ with 30 HIV+ men and women revealed that inexperienced computer users can use a tablet PC for computer counseling. We also present qualitative interview data from participants who reported being more honest answering risk assessment questions with a computer than with a person because of social biases. If participants are more honest with CARE+ it will provide them with tailored information they may not get from other

sources and will help them make a realistic plan based on their current behavior. We also identify qualities participants felt were important and that a computer cannot provide, such as empathy, compassion, and caring. Our findings suggest that CARE+ can be a valuable tool for HIV+ people, especially when coupled with excellent and available providers.

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