Feasibility of Using Computer-Assisted Interviewing to Enhance HIV Test Counseling in Community Settings

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SYNOPSIS

Objectives. Significant advances in the treatment of human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) place a premium on early detection and linkage to care. Recognizing the need to efficiently yet comprehensively provide HIV counseling, we assessed the feasibility of using audio computer-assisted self-inventory (A-CASI) in a community-based HIV counseling and testing facility.

Methods. A convenience sample of 50 adults presenting for HIV testing was recruited to complete an 85-item computerized HIV Assessment of Risk Inventory (HARI) containing domains of demographics, sexual behaviors, alcohol and substance use, emotional well-being, past experiences with HIV testing, and attitudes about taking HARI.

Results. Client acceptance rate was limited by the completion time outlined during the intake process. However, the majority of respondents who completed HARI felt that it took only a short to moderate time to complete and was easy to understand. A majority also reported a preference for using a computerized format in the future. Further, HARI identified a number of risk-taking behaviors, including unprotected anal sex and substance use prior to past sexual encounters. Additionally, more than half of the sample reported moderate to severe depressive symptoms.

Conclusions. Those respondents who had time to complete the survey accepted the A-CASI interview, and it was successful at identifying a substantial level of risk-taking behaviors. A-CASI has the potential to guide HIV counselors in providing risk-reduction counseling and referral activities. However, results suggested the need to shorten the instrument, and further studies are needed to determine applicability in other HIV testing sites.

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Approximately one million Americans are living with the human immunodeficiency virus (HIV) and it is estimated that 40,000 new infections occur annually.[1] The availability of effective treatment modalities holds the promise of improving the lives of those already infected while also reducing transmission. However, it is estimated that 250,000 Americans are living with the virus while unaware of their status.[2] The Centers for Disease Control and Prevention (CDC), as well as many state and city departments of health and professional organizations, have united in calling for increased testing and linkages to care to provide needed treatment and transmission-reduction services.

The increased availability of rapid HIV tests promises to assist clinicians and community health educators in quickly identifying HIV-positive clients. The rise in rapid testing has been accompanied by a desire to reduce potential barriers that may impede testing. Pretest counseling has been identified as one such potential barrier.[3,4] Traditionally, pretest counseling—delivered by a clinician, health educator, or HIV counselor—served to provide the patient not only with basic information about HIV and the testing procedure itself, but also with an opportunity to assess the client's risk-taking profile and readiness to test, as well as the availability of a support network to help the patient cope with a positive diagnosis.[5] Assuming the client was ready, willing, and able to test, the client would then review and sign a consent form indicating understanding and agreement with testing procedures. Upon receipt of a negative HIV test result, additional risk-reduction and prevention messages could be initiated and reinforced in a subsequent posttest counseling session. Clients testing positive would be linked to treatment services.

With the call for increased rapid testing, a more streamlined approach has been adopted in many settings. For example, in New York City, providers are only required to present an informational brochure or video and be available to answer questions.[6] And recently, there has been a push to eliminate pretest counseling altogether. The New York City Health Commissioner, Dr. Thomas R. Frieden, has written that the existence of regulations mandating counseling, separate written consent, and the separation of counseling and testing from routine medical care "result in missed opportunities to diagnose, treat, and stop the spread of HIV infection."[7] Proponents of eliminating pretest counseling state that this would further normalize HIV testing. In this new model, patients would be given the opportunity to opt out of testing if they wished, but unless they voiced opposition, they would be tested. If rapid HIV tests were utilized, counseling would be

conducted while the specimen was being processed or following delivery of results, positive or negative. It is asserted that there is a lack of compelling evidence indicating that the pretest counseling visit results in behavior change for seronegative individuals.[8,9] Furthermore, eliminating pretest counseling would result in economic cost savings, as it is estimated that 62% of the cost of counseling and testing for seronegative individuals is attributable to the counseling component, roughly half of which can be assigned to pretest counseling.[10]

While we recognize the public health urgency of identifying individuals who would benefit from HIV services, and the economic realities of doing so in a prudent fashion, we also offer a cautionary note and call for the reexamination of the potential utility of pretest counseling. Those in favor of pretest counseling cite its importance as a mechanism for informing patients about the risks and benefits of a clinical procedure, encouraging patient self-reflection, and establishing a process that may eventually result in behavior change.[3,11,12] Additionally, the process of engaging a client in pretest counseling may identify additional issues in need of attention and referral, such as substance abuse or involvement in relationship violence. Further, while the majority of patients who test positive are able to cope with their new diagnosis and become engaged in care, others may become distraught or difficult to engage. Still others may become suicidal or violent toward previous partners.[13–18] Elimination or even substantial reduction of pretest counseling may limit the ability of health providers and counselors to detect individuals in need of supportive services. Moreover, it may short-circuit the engagement process that is critically important in effectively linking seropositive clients to comprehensive care programs.

Obviously, the ultimate solution lies in finding a way to address concerns about time, cost, and efficacy, while also preserving the benefits that pretest counseling provides in assessing risk, readiness, mitigating factors, and social support. One possible solution could be through the use of audio computer-assisted self-interview (A-CASI). A-CASI interview programs have been used for many years and have been shown to be well-received by patients, while also facilitating the accurate retrieval of sensitive information.[19–25] In one analysis of a computer assessment and risk-reduction education tool for sexually transmitted infections (STIs) and HIV, patients reported feeling an increased sense of confidentiality, increased willingness to be honest, and a lack of feeling judged by their responses.[24] Similarly, in a longitudinal study using A-CASI to assess HIV risk behavior and infection among men who have sex

with men (MSM) and intravenous drug users (IDUs), a majority of participants felt that A-CASI elicited more honest responses than interviewer-administered questionnaires.[21]

However, to our knowledge, this system has not yet been used specifically in HIV counseling and testing. Therefore, this study examined the feasibility of incorporating an A-CASI interview program into the HIV counseling process at Gay Men of African Descent (GMAD), a community-based organization in New York City that provides supportive services and HIV counseling and testing services for high-risk individuals, with a focus on African American MSM. Specifically, this study sought to determine if an A-CASI interview program, HIV Assessment of Risk Inventory (HARI), would be acceptable to clients and if it could successfully identify risk-taking behaviors among the study population.

METHODS

Questionnaire

An 85-item, self-administered, computerized HARI was developed in conjunction with colleagues at GMAD. The survey incorporated items obtained from several HIV behavioral risk assessment questionnaires and standardized measures of depression.[26,27] Questions were written at an eighth-grade literacy level and contained the following domains: demographics, general health, sexual health and behaviors, alcohol and substance use, emotional well-being, relationships, and past experiences with HIV testing. Additional items assessed experiences with and attitudes toward the computerized risk-assessment instrument.

The survey was administered via A-CASI technology on laptops at GMAD, with responses submitted online over a Secure Sockets Layer connection in accordance with Columbia University and New York Presbyterian Hospital security protocols to a secure database. The computerized questionnaire assigned respondents an identification number and did not collect personally identifying demographic information. The project was reviewed and approved by Columbia University's Institutional Review Board.

Procedure

During a five-month period in spring and summer of 2007, adults aged 18 and older seeking HIV counseling and testing services at GMAD were offered the opportunity to complete the computerized risk assessment prior to seeing an HIV counselor. The computerized risk assessment was described as a tool that would facilitate pretest counseling and would take approximately 20 to 30 minutes to complete. Those who chose

to participate were directed, whenever possible, to a private room where they could view and respond to the survey on a computer screen. To address potential literacy issues, clip-art graphics related to the topic of each question were included on the screen, and participants were given the option of wearing a headset in which they could hear each question read aloud. For their participation in the computerized aspect of pretest counseling, respondents were given a $10 gift card to a local grocery store.

Analysis

Data were automatically entered into a Microsoft® Access database linked to the A-CASI program and then analyzed using SAS® software.[28] Data were analyzed for descriptive statistics of participant risk behaviors and response to the survey method itself.

RESULTS

Participants

Of the 146 individuals who presented to GMAD for HIV counseling and testing during the study period, 50 (34%) participated in the study and completed the computerized risk assessment prior to their HIV pretest counseling session. Table 1 presents sociodemographic characteristics of study participants. The majority of subjects were male (90%) in the 35 to 54 age range (57%), and self-identified as black (78%). About one-third of the sample had completed less than a high school level of education, 44% had received a high school diploma or equivalent, and 24% had completed at least some college or vocational training. At the time of assessment, only 30% reported current employment. With respect to health insurance coverage, 19% had no insurance coverage, with the remainder covered by private insurance (15%) or Medicaid (65%). In terms of sexual identity, 40% self-identified as gay, homosexual, lesbian, or "same gender loving;" 46% as bisexual or on the "down-low;" and 12% as heterosexual (straight).

Participant utilization of and satisfaction with HARI

The mean time to complete the survey was 28 minutes, with a range of 10 to 80 minutes. Individuals with a high school degree or greater completed the survey in the shortest time frame (20 to 22 minutes), as compared with those individuals with less than a high school education (39 minutes). There were no differences noted with respect to age or race. Table 2 presents results from the questions exploring participant attitudes and satisfaction with completing HARI. The majority of respondents (69%) assessed the amount of time it took

to complete the questionnaire as short to moderate; 82% reported that completing the survey in computer format was easy overall; and 93% thought the questions and language were easy to understand. Furthermore, 71% reported that it was helpful to hear the questions read aloud through a headset. There were no significant differences in responses to these questions based on age, ethnicity, or level of education.

By contrast, in regard to comfort level (i.e., privacy and confidentiality), responses were equally split between neutral or comfortable (50%) and uncomfortable (50%). There were significant differences ($p<0.05$) in the percent of respondents who reported feeling uncomfortable about privacy and confidentiality between those aged 18 to 34 (31%) and those aged 35

Table 1. Sociodemographic characteristics of HARI participants (n=50)[a]

Characteristic	N	Percent
Gender		
Male	43	89.6
Female	3	6.3
Transgender	2	4.2
Age (in years)		
18–34	17	34.7
35–54	28	57.2
≥55	5	8.2
Race/ethnicity		
Black	39	78.0
Hispanic	7	14.0
Other	4	8.0
Educational attainment		
<12th grade	16	32.0
High school graduate or equivalent	22	44.0
College or vocational school	12	24.0
Currently employed		
Yes	15	30.0
No	35	70.0
Health insurance		
No insurance	9	18.8
Private insurance	7	14.6
Medicaid	32	64.7
Sexual identity		
Homosexual		
(gay, lesbian, "same gender loving")	20	40.0
Bisexual or "down-low"	23	46.0
Heterosexual (straight)	6	12.0

[a]Missing data and refusals not included, so certain subgroups may not total 50. Percentages are based on the number who answered the question.

HARI = Human Immunodeficiency Virus (HIV) Assessment of Risk Inventory

Table 2. Perceptions toward HARI (n=50)[a]

Perception	N	Percent
Amount of time to complete computerized questionnaire		
Way too long or somewhat long	12	26.7
Moderate	24	53.3
Somewhat short or very short	7	15.6
Ease or difficulty completing questionnaire in computer format		
Very easy or somewhat easy	37	82.2
Moderate	7	15.6
Somewhat difficult or very difficult	1	2.2
Ease or difficulty understanding questions and language used		
Very easy or somewhat easy	42	93.3
Moderate	3	6.7
Somewhat difficult or very difficult	0	0.0
Helpfulness in hearing questions read aloud through headset		
Very helpful or somewhat helpful	32	71.1
Moderate	4	8.9
Somewhat unhelpful or very unhelpful	5	11.1
Comfort level in terms of privacy and confidentiality in completing questionnaire in computer format		
Very comfortable or somewhat comfortable	15	33.3
Neutral	8	17.8
Somewhat uncomfortable or very uncomfortable	22	48.9
Preferred future questionnaire format		
Computer (similar to HARI)	39	78.0
Paper and pencil	3	6.0
Face-to-face interview	3	6.0
Don't know	5	10.0

NOTE: For each item, tests of significance were run on ethnicity, age, and level of education. The only significant difference ($p<0.05$) was between age groups (18 to 34 vs. 35+) on comfort level in terms of privacy and confidentiality.

[a]Missing data and refusals not included, so certain subgroups may not total 50.

HARI = Human Immunodeficiency Virus (HIV) Assessment of Risk Inventory

and older (61%). However, most respondents (78%) said that if they were asked to complete another risk assessment survey in the future, they would prefer to complete it in a computer format similar to HARI. These responses did not vary significantly by age, level of education, or ethnicity. According to one respondent, the computer was favored ". . . because I think it's faster and I don't have to deal with people!" Another felt that being in control and feeling comfortable contributed to his ability to answer questions openly and honestly: ". . . I felt that because I was alone taking the test, it was very private and I could take the test at my own pace and be honest with all my answers."

High-risk behavior

Table 3 presents selected risk factors associated with exposure to HIV. Overall, self-reported responses by

Table 3. Selected risk characteristics (*n*=50)

Characteristic	N	Percent
Vaginal or anal sex ever		
Yes	48	98.0
Don't know	1	2.0
Number of lifetime sex partners		
1–5	5	10.6
6–10	8	17.0
11–20	7	14.9
≥21	27	57.5
Last three months, sex with:		
Person who used needles to inject street drugs	12	27.3
Man or woman who had traded sex		
for drugs or money	23	56.1
Man or woman who is HIV-positive	12	27.9
Traded sex for drugs, money, or shelter, past three months	18	72.0
Anonymous sex,[a] last six months	27	87.1
Unprotected anonymous sex,[b] last six months	23	46.0
Unprotected anal sex, last three months	32	82.1
Number of unprotected anal sex partners, last three months		
0	6	15.0
1–5	16	40.0
6–10	7	17.5
≥11	11	27.5
Substance use before sex, last three months		
Alcohol	27	46.0
Marijuana/pot/weed	20	40.0
Cocaine/coke/crack	11	22.0
Heroin	6	12.0
Poppers/rush	3	6.0
Ecstasy/E	3	6.0
Clinical risk for HIV exposure[c]		
Lower risk	4	10.0
Higher risk	36	90.0
Self-reported risk for HIV		
No risk	16	38.1
Low risk	12	28.6
Medium risk	11	26.2
High risk	3	7.1

participants revealed a high degree of risky sexual and substance use behaviors. Almost the entire sample reported previous sexual activity (98%), with 58% reporting 21 or more lifetime partners. Respondents revealed having had recent sex partners (in the past three months) who also engaged in risky behaviors, with almost a third reporting sex with a person who was known to be an IDU or with a person who was known to be HIV-positive (27% and 28%, respectively). Likewise, 56% reported sexual relations with a person who had traded sex for drugs or money. Similarly, 72% of respondents revealed having traded sex for drugs,

Table 3 (continued). Selected risk characteristics (*n*=50)

Characteristic	N	Percent
Tested for STIs, ever	34	72.3
Tested positive for STIs, ever	23	48.9
Tested for HIV, ever	40	80.0
Signs of depression,[d] last two weeks		
None	24	48.0
Moderate	10	20.0
Major	8	16.0
Severe	8	16.0
Medicated for mental health condition, ever	19	41.3
Hospitalized for mental health condition, ever	16	34.8

NOTE: Missing data and refusals not included, so certain subgroups may not total 50.

[a]Anonymous sex was defined as penile or vaginal sex with a stranger.

[b]Unprotected anonymous sex was assessed with two different questions: (*1*) "In the past six months, when you had anonymous sex, about how often did you use condoms?" Responses to this question were mutually exclusive along a five-point scale, including always, most of the time, sometimes, rarely, or never. (*2*) "The last time you had anonymous sex, did you use a condom?" Respondents answered yes or no.

[c]Clinical risk is a composite of four variables, including anonymous sex in past six months, frequency of condom use during anonymous sex in past six months, condom use at last anonymous sexual encounter, and number of different unprotected anal sex partners in past three months.

[d]Signs of depression were assessed using the PHQ-9, a nine-item depression scale from the Patient Health Questionnaire. Cutoff scores were defined as not depressed (1–4), moderate depression (5–9), major depression (10–14), and severe depression (≥15).

HIV = human immunodeficiency virus

STI = sexually transmitted infection

money, or shelter during the last three months, and 87% reported having participated in anonymous sex, defined as penile or vaginal sex with a stranger, during the past three months.

In regard to unprotected sex, defined as sex without a condom, 46% of the total sample had engaged in unprotected anonymous sex during the previous six months, and 82% reported having engaged in unprotected anal sex during the previous three months. In regard to unprotected anal sex, 28% of the sample reported having 11 or more different anal sex partners during the previous three months. With respect to STIs, 72% had previously been tested for STIs, and nearly half (49%) had been told by a medical provider that they had tested positive; 80% reported previous HIV testing experiences.

Alcohol or drug use before sex were also frequently reported behaviors, with 46% of respondents reporting having consumed alcohol before sex at least once

during the last three months, and 40% reporting marijuana use and 22% reporting cocaine use prior to intercourse. Similarly, mental health problems appeared to be a substantial issue, with more than half of the sample (52%) afflicted by moderate to severe symptoms of depression during the previous two weeks.

Despite candid reports of risky sexual and substance use behaviors, perceptions of HIV risk were low among the study sample. The majority of respondents characterized themselves as being at no risk (38%), low risk (29%), or medium risk (26%) for acquiring HIV. Only 7% of respondents perceived themselves as being at high risk for HIV infection. Based on responses to questions about recent unprotected anonymous sex and unprotected anal sex, a variable was created to describe clinical risk for HIV—that is, those who had engaged in recent unprotected anal intercourse were categorized as high risk. At one end of the spectrum, there was concordance among individuals we rated as low risk and their individual perception of risk. However, many of those we assessed as high risk (90% of the sample) also rated themselves as being at no risk (33%) or low risk (35%). Another third (29%) rated themselves as being at medium risk. Only one participant who we assessed as higher risk was concordant, with an individualized perception of being at high risk.

DISCUSSION

It appears that HARI was readily accepted among those individuals who perceived themselves as having the time to interact with the system. Additionally, HARI identified a substantial amount of sexual and substance use risk-taking behaviors. Results showed that once introduced to HARI, individuals appreciated the ability to complete a risk assessment via computer. The majority of the respondents actually preferred using the computer to report risk-taking behaviors. These findings support other studies using the A-CASI method to uncover sensitive details.[19–25]

On the other hand, half of respondents reported feeling very or somewhat uncomfortable in terms of privacy and confidentiality issues, with older individuals significantly more likely to hold this view than younger participants. This may be attributable to less comfort and more suspicion about computers and technology. Although the study protocol called for clients to complete the survey in a private room, this was not always possible due to space constraints, and some completed the survey in a general waiting area. While privacy screens and headphones were available and counselors attempted to limit traffic, the potential impact on compromising privacy was noted. Finally, a number of detailed, sensitive questions were asked, which may also have contributed to this finding. However, despite these concerns, 78% of the sample stated they would prefer to take a computer-based risk assessment in the future.

With respect to the identification of risky behaviors, HARI appeared to be successful at identifying a number of individuals involved with risky sexual and substance use behaviors. However, accurate perception of risk for potential acquisition of HIV was low, similar to findings reported by Mackellar et al., and underscores the need for counseling and educational sessions to assist clients in adopting more effective harm-reduction practices.[29] Similarly, more than half of our sample indicated symptoms of moderate to severe depression during the past two weeks, indicating the need for further evaluation or referral to a mental health provider. The streamlined approach to pretest counseling, by definition, would not have identified individuals for whom these additional services might prove beneficial.

While HARI appears to have significant utility, this study identified completion time as a crucial barrier affecting feasibility of integration into HIV testing sites. The overall response rate was relativity low (34%). According to GMAD test counselors, age, educational background, and comfort level with using computers did not appear to influence a client's decision to participate. Rather, participation rates were most likely affected by concerns about the time commitment required to complete the instrument (Personal communication, Columbus Gaskins, GMAD, February 2008). Nevertheless, it would have proved instructive to specifically ask those who declined participation their reasons for choosing not to complete the computerized survey. This will be included as a further component in future studies.

It should also be noted that after a client completed the computerized risk assessment, each counselor was provided with a printout summarizing the client's risk profile. Additional evaluation will be needed to assess the duration of time it took the counselor to review and discuss findings with the patient and to arrange for additional services as needed, as this was not a focus of our initial pilot study. While clients relating minimal risk-taking behaviors may require only a brief encounter with the counselor prior to testing, clients exhibiting moderate to high risk-taking behaviors may require more time than traditional encounters. However, the quality of those encounters may be improved as the counselor is able to focus attention on areas of concern rather than spending precious time gathering data. Nonetheless, factors related to

provider acceptance of this modality will need to be assessed in future studies.

Furthermore, the potential exists to customize the system by adding algorithms to provide patients with tailored educational messages and support. Text-based, audio, or multimedia risk-reduction messages could relay specific information to each client based on assessment of that client's own particular characteristics. Such reinforcement could augment information provided by the counselor or provider. Research has found that tailored messages are more likely to be read and remembered, perceived to be interesting, and personally relevant.[30] Likewise, studies report that computer-assisted instruction has been effective in increasing knowledge about HIV and acquired immunodeficiency syndrome (AIDS) and intention to practice HIV preventive behaviors.[31,32] Conceivably, if these functions were provided in a timely, efficient manner, it might enhance the appeal of the system to busy counselors and providers.

Limitations

This study had several limitations. The data were self-reported, which presents the possibility of recall and social desirability biases. Social desirability bias may have contributed to respondents reporting less accurately about high-risk behaviors and more favorably about their opinions toward the computerized format. Recall bias may have led to inaccurate reports of the number of sexual experiences or partners. Yet results pointed as expected to a very high-risk population comparable to other studies with similar populations. Further limitations included a lack of random selection of study participants, a small sample size, and the lack of a control group. As such, results are not generalizable.

The eighth-grade reading level of the questionnaire may also have posed a problem for those with literacy issues. However, we attempted to address comprehension by utilizing clip art to complement the text, as well as giving clients the option of hearing the text read out loud. Overall, the majority (93%) of those completing HARI reported that the questionnaire was easy to understand. Nevertheless, this could also be due to selection bias, with those choosing to complete the survey starting out as more literate or comfortable with technology.

In regard to missing data, respondents had the option of skipping questions that they did not feel comfortable with or were unable to answer. For the HARI-related questions, there was a 10% (*n*=5) missing data rate. We feel this was most likely due to the length of the questionnaire; respondents were possibly tired of answering questions and merely skipped the final items in regard to the computerized testing experience. To remedy this in the future, we will considerably shorten the survey.

An additional limitation was that the system was developed in English and tested among a predominantly MSM population. Future efforts should focus on simplifying and refining the system, translating it into Spanish, and assessing its utility as an adjunct to HIV counseling efforts in other clinical settings, and with other populations, such as heterosexual men and women attending family planning and sexually transmitted disease clinics, primary care clinics, and hospital emergency departments.

CONCLUSIONS

Findings from this small pilot study showed that a computerized risk assessment, HARI, was found to be generally acceptable by patients seeking HIV counseling and testing services in a community-based program. There is evidence that it was also successful at identifying a substantial amount of risk-taking behaviors that could potentially drive further harm-reduction counseling and referral efforts.

Time and resources are at a premium in many settings where HIV testing is conducted. However, rapidly speeding through the pretest counseling process or eliminating it entirely could potentially reduce the ability of counselors to obtain valuable information needed to initiate harm reduction and behavior change recommendations. Further, it would limit potential referrals for substance abuse or mental health counseling. However, to enhance practical appeal to consumers, the length of our instrument needs to be scaled down considerably. Additional studies are also needed to assess factors that would encourage use by providers.

Overall, this feasibility pilot project suggests that computerized risk assessment prior to HIV counseling and testing could be successfully developed and implemented, and the potential of this application appears promising. We believe that with further refinement, HARI could successfully enhance the counseling and testing experience for patients and potentially for providers as well.

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