Effectiveness of Healthy Relationships Video-Group—A Videoconferencing Group Intervention for Women Living with HIV: Preliminary Findings from a Randomized Controlled Trial

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Abstract

Introduction: Expanded access to efficacious interventions is needed for women living with human immunodeficiency virus (WLH) in the United States. Availability of “prevention with (human immunodeficiency virus [HIV]) positives” interventions in rural/remote and low HIV prevalence areas remains limited, leaving WLH in these communities few options for receiving effective behavioral interventions such as Healthy Relationships (HR). Offering such programs via videoconferencing groups (VGs) may expand access. This analysis tests the effectiveness of HR-VG (versus wait-list control) for reducing sexual risk behavior among WLH and explores intervention satisfaction. **Subjects and Methods:** In this randomized controlled trial unprotected vaginal/anal sex occasions over the prior 3 months reported at the 6-month follow-up were compared across randomization groups through zero-inflated Poisson regression modeling, controlling for unprotected sex at baseline. Seventy-one WLH were randomized and completed the baseline assessment (n=36 intervention and n=35 control); 59 (83% in each group) had follow-up data. **Results:** Among those who engaged in unprotected sex at 6-month follow-up, intervention participants had approximately seven fewer unprotected occasions than control participants (95% confidence interval 5.43–7.43). Intervention participants reported high levels of satisfaction with HR-VG; 84% reported being “very satisfied” overall. **Conclusions:** This study found promising evidence for effective dissemination of HIV risk reduction interventions via VGs. Important next steps will be to determine whether VGs are effective with other subpopulations of people living with HIV (i.e., men and non-English speakers) and to assess cost-effectiveness. Possibilities for using VGs to

expand access to other psychosocial and behavioral interventions and reduce stigma are discussed.

Key words: telehealth, human immunodeficiency virus/AIDS, intervention studies, Healthy Relationships intervention, videoconferencing, risk reduction behavior

Introduction

The U.S. National HIV/AIDS Strategy suggests all people living with human immunodeficiency (HIV) should have access to effective behavioral interventions (EBIs) for reducing transmission of HIV to others, reducing their own acquisition of other sexually transmitted infections (STIs), and meeting their psychosocial needs.¹ Individual and group-based behavioral interventions have been developed to meet the diverse needs of women living with HIV (WLH), and some have been efficacious in clinical trials.^{2,3} Multiple efficacious, group-based interventions for WLH have been designated “EBIs” by the U.S. Centers for Disease Control and Prevention (CDC),⁴ which provides technical support to encourage their dissemination. Yet access to such interventions in rural or remote areas remains limited, leaving WLH in these communities few options for receiving empirically validated behavioral interventions.

Previous research has demonstrated the potential for Internet-based group videoconferencing (videoconferencing groups [VGs]) to deliver services to individuals with difficulties accessing such programs in-person. VGs have been used successfully to deliver skills training and psychosocial support for women with breast cancer,⁵ caregivers of older adults,⁶ and stem cell transplant recipients.⁷ Although the effectiveness of VGs for people living with HIV has not been tested in randomized controlled trials (RCTs), previous work suggests that many WLH might be willing to attend VGs, especially if they are accessed at trusted community locations and include safeguards to ensure confidentiality and security.⁸

Healthy Relationships (HR)² is an EBI shown to significantly reduce sexual risk behavior among people living with HIV,^{2,9} which has not reached many WLH in rural or remote areas and appears well suited for VG delivery. HR is a five-session program designed to promote disclosure decision-making and safer sexual behavior among people living with HIV. Based on social cognitive theory,¹⁰ HR uses video clips from professional movies to stimulate discussion and decision-making around potential disclosure and sexual behavior scenarios. Participants then role-play each scenario.

Additionally, participants receive instruction in the proper use of male and female condoms and rehearse condom application.

To increase the reach and uptake of HR, we adapted HR for delivery to WLH using specialized videophones accessed at “intervention stations,” defined as private rooms in trusted community settings. The resulting intervention, HR-VG, was compared with a wait-list control (WLC) group in a preliminary RCT. The primary objective of the trial was to gather preliminary data to test the effectiveness of HR-VG in reducing sexual risk. We hypothesized that 6 months following the intervention, relative to participants in the WLC condition, participants in the treatment condition would report fewer occasions of unprotected vaginal or anal intercourse. We also expected those in the treatment condition would be satisfied with the intervention experience.

Subjects and Methods

This study was reviewed and approved by the Institutional Review Boards of all participating academic institutions and recruitment clinics.

THE INTERVENTION

To recruit intervention sites, we contacted managers and providers of care in county health departments and HIV/AIDS service organizations in four Florida counties. Those contacts either agreed to host an intervention station or suggested other potential partners. Six community sites agreed to host a total of seven intervention stations. Five stations were located within local nongovernmental HIV/AIDS service organizations, one was located at a public health department that provided HIV-related services, and one was located at a nongovernmental agency that provided non-HIV-related services (e.g., weatherization support) but whose director also oversaw an HIV/AIDS service organization in another county.

Intervention stations consisted of a private room with a desk/table, a chair, wired Internet access, a computer (for assessments), and a Cisco E-20 videophone (Cisco Systems, San Jose, CA),¹¹ which was used for intervention delivery. We provided the videophone and computer. Also, to ensure appropriate bandwidth for the videoconferencing, we paid for a dedicated Internet line with high-speed service for all sites except one, where organizational requirements led to using the existing Internet infrastructure. Each participant sat individually in front of the videophone to participate synchronously in the intervention, guided by two trained facilitators, with up to six WLH at other locations. The computer was used for assessments only, as previous technology testing and focus groups with WLH suggested the videophone would be a more appealing delivery modality than the computer.⁸

In exchange for a small monthly stipend (\$300–\$350), each site agreed to designate a staff person (or persons) as a site liaison. Liaisons were responsible for preparing the intervention station prior to each session by plugging in and turning on the videophone and computer. Also, liaisons greeted participants, confirmed their identity and HIV status, provided condom models and related materials as appropriate, and managed research incentives, including gift cards,

gas cards, or bus passes. Finally, liaisons used an instant messaging service during sessions to maintain communication with study staff regarding protocols and technical issues.

As with HR, HR-VG had two facilitators. The facilitator station for HR-VG was at the lead author's institution. Two trained facilitators together used more complex videoconferencing equipment than the participants, including the Cisco C 20,¹² a separate liquid crystal display screen, and a liquid crystal display projector to display video clips captured by the C 20 videocamera for viewing by HR-VG participants. Both facilitators were WLH; one was a mental health counselor with a Master of Social Work degree, and the other was a community member without formal post-secondary education. Each facilitator completed the official HR training, provided by a CDC-contracted agency. However, for this study, facilitators delivered a version of HR that was adapted specifically for the VG context and placed special emphasis on gender-specific issues related to disclosure and safer sex, including disclosing their HIV status to children, disclosing their status to partners related to desired or actual pregnancy, and considering disclosure in the context of domestic violence.

Guided by the ADAPT-ITT model,¹³ the adaptation of HR to HR-VG was conducted with a community advisory board composed of WLH and representatives of community agencies serving WLH. HR-VG included all core elements of HR¹⁴ and retained all activities from HR—with some modifications (i.e., role plays, condom skills practice, and other activities required minor adjustments to work over the videophone). Instead of five sessions, HR-VG was delivered over six 2-h sessions to allow time for introducing participants to the videophones and for some activities that may take longer over the videophone than in-person. For example, with the Risk Continuum Banner activity for HR, participants move around the room to stick cards on a continuum, based on the perceived levels of risk associated with each activity written on the cards. Then the group discusses the placement of the cards. In HR-VG, participants remain in their seats and work independently on assigning select items to the continuum on their handout before telling the facilitator where to place the cards on the continuum they see on the video screen; this process takes longer than the in-person equivalent.

RECRUITMENT AND RANDOMIZATION

Recruitment flyers were posted at clinics and other organizations serving WLH in each catchment area. Interested WLH could contact the study office by telephone or e-mail or complete an information sheet and deposit it in a locked box for study staff to retrieve for follow-up. Eligibility screening was conducted over the phone within 1 month prior to the start of each group. To be included, women must have (a) self-identified as female, (b) been age 18 years or older, (c) spoken English fluently, (d) been available to attend HR-VG at an available intervention station, (e) self-reported HIV seropositive status, and (f) had vaginal or anal sex within the past 3 months at time of eligibility screen. WLH were excluded if they had previously completed HR in-person.

After meeting eligibility requirements, interested WLH were scheduled to complete informed consent and then a baseline assessment at their intervention site. WLH were able to choose their intervention site in one county only; in three of the four counties, only one location was available. WLH were required to bring proof of HIV status (i.e., Ryan White letter or recent lab report) and photo identification in order to participate. At the end of the baseline assessment, each participant was given an envelope informing her and the study liaison of her randomization condition. Those randomized to Option 1 completed the intervention the following month (six sessions over a 3-week period). Those randomized to Option 2 composed the WLC group; both groups completed a 6-month follow-up assessment.

ASSESSMENTS

Baseline, immediate post-intervention, and 6-month follow-up assessments were administered via Audio Computer-Assisted Self Interview. Participant characteristics were assessed, including demographics, technology use, information about participants' HIV diagnosis, and partnership status. Sexual behavior was assessed at baseline and 6 months using a modified version of the Sexual Risk Behavior Assessment Schedule for Adults.¹⁵ Convergent validity of this measure has been supported in studies linking sexual behavior with reports of STIs.¹⁶ Participants were asked to report on their behavior with their three most recent sexual partners over the last 3 months. For each partner, participants reported the number of times they engaged in each type of sexual behavior (i.e., vaginal and anal sex) over the last 3 months and then reported the number of times a condom was used (from start to finish) for each type of sexual behavior. The main outcome—number of unprotected sex occasions—was the total number of unprotected vaginal and anal sex occasions reported with those partners over the prior 3 months. Intervention quality and satisfaction were assessed via participant self-report at the immediate post-intervention assessment; questions were adapted from the Client Satisfaction Questionnaire-8.¹⁷

STATISTICAL APPROACH

Frequencies were generated for satisfaction data at immediate post-intervention assessment. Descriptive, chi-square, *t* test, and Wilcoxon rank-sum tests were conducted for demographic characteristics and outcomes at baseline. Groups were not statistically significantly different at baseline on any of the background factors or the dependent measures, nor were the background factors significantly correlated with changes in the outcome measures. Thus, the analysis focused on the unadjusted 6-month outcomes. The main outcome measure (number of unprotected vaginal and anal sex occasions) was skewed with many zero values; thus, standard statistical methods were not appropriate. We used a zero-inflated Poisson (ZIP) regression model,¹⁸ which combines two models. A logistic regression model was used to answer the first question: "Is there a difference between the two groups (intervention and WLC) in the proportion of participants reporting no unprotected sex occasions?" The Poisson regression model was used to answer the

second question: "Among those who reported at least one unprotected sex occasion at 6-month follow-up, is there a difference between the two groups in the frequency of unprotected sex?" Missing data were addressed using multiple imputation.¹⁹ All analyses were conducted with STATA version 12 software.²⁰ All tests were considered significant at $\alpha = 0.05$, two-tailed.

Results

PARTICIPANTS AND BASELINE CHARACTERISTICS

Participants were recruited between January and October 2011. Altogether, 396 participants were screened (*Fig. 1*). Seventy-one WLH were eligible, completed the baseline assessment, and were then randomized (36 to the intervention group and 35 to the WLC group). Thirty-five intervention participants (97%) completed at least one intervention session. Attrition was generally low: 83% completed the 6-month follow-up assessment (83% of intervention and 83% of WLC participants).

Table 1 shows the distribution of participant characteristics and behaviors reported at baseline. Tests of association conducted for each variable across randomization group confirmed that baseline characteristics and behaviors did not differ statistically. *Figure 2* displays the distribution of nonzero observations (i.e., number of unprotected sex occasions for those who engaged in at least one unprotected sex occasion) removing outliers (more than 4 standard deviations [SDs] away from the mean) across groups at 6-month follow-up.

More than half of the 71 WLH in our study (56%) self-identified as black/African American. Participants' ages ranged from 20 to 58 years (mean, 42.9 years; SD, 8.6 years). One-third (34%) had no formal education past high school. A few participants (10%) were employed either full-time or part-time. Nearly 20% had never used a

Fig. 1. Recruitment, randomization, and retention.

Table 1. Characteristics of Participants of the Healthy Relationships Videoconferencing Group at Baseline for Intervention (*n*=36) and Control (*n*=35) Randomization Groups

CHARACTERISTIC	INTERVENTION	CONTROL	P VALUE
Age (year)	42.1 ± 9.4	43.7 ± 7.8	0.44 ^a
Ethnicity			
Hispanic/Latino ^b	4 (11%)	5 (14%)	0.74 ^c
Black ^b	21 (58%)	19 (54%)	0.73 ^d
Education			
Did not complete high school	15 (42%)	8 (23%)	0.16 ^d
Received high school diploma/GED	12 (33%)	12 (34%)	
Attended some college or higher	9 (25%)	15 (43%)	
Currently enrolled as student	4 (11%)	2 (6%)	0.67 ^c
Employment			
Employed full-/part-time	5 (14%)	2 (6%)	0.25 ^c
Retired/on disability	15 (42%)	21 (60%)	
Not employed for pay	16 (44%)	12 (34%)	
Food security			
I get enough to eat often	29 (81%)	23 (66%)	0.16 ^d
I am hungry sometimes/often	7 (19%)	12 (34%)	
In a romantic relationship	29 (81%)	25 (71%)	0.37 ^d
At least 1 partner is HIV positive ^e	13 (42%)	10 (34%)	0.55 ^d
Disclosed HIV status to at least 1 partner ^e	28 (90%)	24 (83%)	0.47 ^c
Number of unprotected sex occasions			
None	23 (64%)	26 (74%)	0.34 ^d
At least 1			
Quartile 1	3	2	0.87 ^f
Quartile 3	22	25	

^aBy *t* test.^bPersons reported being Hispanic or black but not both.^cBy Fisher's exact test.^dBy chi-squared test of association.^eOnly persons who reported having at least one sex partner within the last 3 months at baseline (*n*=31 and 29 for the intervention and control groups, respectively).^fBy Wilcoxon rank-sum test.

HIV, human immunodeficiency virus.

OUTCOMES AT 6-MONTH FOLLOW-UP

Controlling for number of unprotected sex occasions at baseline, the logistic regression part of the ZIP model indicates no statistically significant difference across groups in the odds of engaging (versus not engaging) in *any* unprotected sex. The Poisson part of the ZIP model shows that, among those who engaged in any unprotected sex occasions in the 3 months prior to the 6-month follow-up, on average, intervention group participants had 6.89 fewer unprotected sex occasions than WLC participants (Table 2). Similar results were found when missing data were imputed (data not shown).

EXPERIENCES AND SATISFACTION WITH INTERVENTION

Most intervention participants (84%) rated the intervention quality as excellent overall and were very satisfied with their HR-VG experience (Table 3). All participants were very (90%) or mostly satisfied (10%) with the way their privacy and confidentiality were protected throughout the VGs. Satisfaction with other aspects of the intervention was high as well.

Discussion

In this study HR was adapted for delivery to WLH using specialized videophones accessed at intervention stations in trusted community settings. When the resulting intervention (HR-VG) was compared with a WLC group in a preliminary RCT, it yielded promising findings that have important implications for HIV prevention. Among WLH who reported having unprotected sex at the 6-month follow-up assessment, intervention participants reported approximately seven fewer unprotected sex occasions than participants in the WLC group. Most HR-VG participants, who generally had low levels of technology use at baseline, also were very satisfied with the intervention delivered via VG. The behavioral and treatment satisfaction outcomes of this investigation are consistent with findings of previous research on the effects of computer technology-based interventions with adolescent and adult populations at risk for STIs.^{21–24} Furthermore, the high level of satisfaction with HR-VG is similar to satisfaction levels found in videoconferencing studies of other populations with chronic illnesses.²⁵ Overall, the results of the present study suggest VGs could be a critical means of addressing the U.S. National HIV/AIDS Strategy's objective of providing all people living with HIV access to behavioral interventions that reduce the risks of transmitting HIV and other STIs.¹

This feasibility trial did not result in a lower likelihood of having *any* unprotected sexual behavior in the intervention versus the control group. This finding is in line with previous intervention research; four of five HIV “prevention with positives” interventions

computer, and only 40% had a home computer with Internet access. Among the 60 WLH who had at least one sexual partner within the 3 months prior to baseline, 38% reported one or more of those partners was HIV-seropositive, and 87% reported they had disclosed their own HIV status to one or more of those partners.

Fig. 2. Box plot showing the difference in unprotected sex occasions between the two groups at 6-month follow-up: difference, 6.89 (95% confidence interval 5.43–8.73; $p < 0.001$). Data represent participants reporting at least one unprotected sex occasion ($n=13$ and 11 in the intervention and control groups, respectively) with a median of 5 and 17 unprotected sex occasions for the intervention and control groups, respectively.

that have been deemed effective by the CDC (www.effectiveinterventions.org/en/HighImpactPrevention/Interventions.aspx) did not report significant differences in *any* unprotected sex between all participants in the intervention and control groups.^{2,3,26–28} Furthermore, the current trial was not powered to detect such differences. In fact, we planned to conduct analysis of covariance to test for incremental reductions in unprotected sex occasions, as done in the original HR trial.² However, a substantial number of participants reported no unprotected sex occasions at both time points, which skewed the data and prevented the use of analysis of covariance. The ZIP analysis presented here allowed us to explore incremental reductions in unprotected sex occasions, but only among those who

had *any* unprotected sex. The ZIP also required comparing groups in the likelihood of having *any* unprotected sex, even when such differences were not expected.¹⁸

The current study is the first to demonstrate that VGs may be an effective delivery strategy for behavioral interventions among people living with HIV and one of the few RCTs⁶ to test the effectiveness of VG delivery of behavioral interventions. Another strength is that HR-VG very closely resembles in-person HR. This similarity to the original intervention is important because it helps maintain fidelity to a previously tested EBI and means that expanding dissemination of HR and other EBIs could be achieved using multiple delivery modalities.

Findings must be considered in light of several limitations. First, data were derived from a small feasibility RCT that was not powered to detect group differences in engaging in any unprotected sex. Second, although HR in-person is offered to men and Spanish speakers, only English-speaking WLH were included in this study. Third, participants were recruited primarily from urban and suburban metropolitan areas; only a small proportion of participants resided in nonmetropolitan or rural locations. This is not ideal, given that a primary advantage of VGs is expanding access to people living in rural/remote areas or areas in which HIV prevalence is lower. Fourth, a WLC group does not allow comparisons of HR-VG against HR, although such comparison may not be relevant to people who would not have access to HR without VGs. Finally, data distributions did not allow for linear regression or analysis of covariance analyses, which would be more comparable to analyses conducted for the original HR RCT.²

This study has important implications for future research and practice. Given the success of HR-VG in this study, larger studies are needed to determine if HR-VG would be acceptable and effective among men living with HIV as well as Spanish-speaking men and women. Also, subsequent research is needed to test whether, and in what circumstances, VGs accessed at community intervention stations will be feasible and effective in rural/remote locations. Finally, a thorough cost analysis of this approach should be conducted to better understand the feasibility of widespread implementation. The costs of an intervention station are relatively low and may decrease over time—roughly \$1,200 U.S. for a videophone and headset, approximately \$80/month for a single dedicated Internet line, and the costs of a small private room. The costs of staffing an intervention liaison or “host” are currently not well understood and must be further explored. We envision a large program that allows numerous agencies throughout the United States to host intervention stations for delivering VGs like HR-VG, as well as other group-based interventions that appeal to the general population (i.e., diabetes education and support, cancer support groups, nutrition and physical activity interventions, etc.). Centralized group facilitation will reduce the training and staffing costs that each agency would otherwise incur.

In summary, this study found promising evidence for the effective dissemination of HIV risk-reduction interventions via VG as a way to expand access to priority populations in need. Community-based

Table 2. Difference in Number of Unprotected Sex Occasions Between Control and Intervention Groups at 6-Month Follow-Up ($n=59$)

RANDOMIZATION GROUP	UNPROTECTED SEX OCCASIONS	
	LOGISTIC REGRESSION [OR (95% CI)]	POISSON REGRESSION [DIFFERENCE (95% CI)]
Intervention	1	0
Control	0.92 (0.24–3.56)	6.89 (5.43–8.73)

Control group participants had 6.89 more unprotected sex occasions than intervention group participants. The model controlled for number of unprotected sex occasions at baseline.

CI, confidence interval; OR, odds ratio.

Table 3. Participants' Satisfaction with the Healthy Relationships Videoconferencing Group (n = 32)

	POOR	FAIR	GOOD	EXCELLENT
How would you rate:				
The quality of the HR-VG program?	0 (0)	0 (0)	5 (15.6%)	27 (84.4%)
The quality of the images of the participants?	2 (6.3%)	2 (6.3 %)	9 (28.1%)	19 (59.3%)
The quality of sound?	2 (6.3%)	1 (3.1%)	11 (34.4%)	18 (56.2%)
	NOT AT ALL SATISFIED	MILDLY SATISFIED	MOSTLY SATISFIED	VERY SATISFIED
How satisfied were you with:				
The amount of support you received?	0 (0)	0 (0)	2 (6.3%)	30 (93.7%)
The location where you received HR-VG?	0 (0)	0 (0)	4 (12.5%)	28 (87.5%)
The helpfulness of staff at the location where you received HR-VG?	0 (0)	0 (0)	1 (3.1%)	31 (96.9%)
Your ability to get to the location where you received HR-VG?	0 (0)	0 (0)	2 (6.3%)	30 (93.7%)
The intervention facilitators?	0 (0)	0 (0)	1 (3.1%)	31 (93.7%)
The way your privacy and confidentiality were protected during HR-VG?	0 (0)	0 (0)	3 (9.4%)	29 (90.6%)
Overall, how satisfied are you with HR-VG experience?	1 (3.1%)	0 (0)	4 (12.5%)	27 (84.4%)
	NO, DEFINITELY NOT	NO, NOT REALLY	YES, GENERALLY	YES, DEFINITELY
If a friend were in need of similar help, would you recommend HR-VG to her?	0 (0)	0 (0)	5 (15.6%)	27 (84.4%)
Data are number (%) of surveys completed by the 32 women who attended the final session of the Health Relationships videoconferencing group (HR-VG).				

intervention stations outlined in this study could be established anywhere in the community; in some communities, an ideal location may be Federally Qualified Community Health Centers (CHCs). The Affordable Care Act, signed by President Obama in 2010, will grow the healthcare workforce and increase funding for CHCs,²⁹ which provide services to low-income individuals and families in medically underserved and, often, in rural/remote areas. Specifically, CHCs will receive \$11 billion over the next 5 years to expand their services, including HIV care, treatment, and prevention. This growth means people living with HIV will have access to care from a variety of new sources.³⁰ Delivering interventions via VG will provide the opportunity for nontraditional HIV care settings, like CHCs, to offer EBIs to their clients at little additional cost. If CHCs use these intervention stations to deliver non-HIV-focused EBIs and other programs as well, then people living with HIV who participate may be comforted knowing that utilizing such stations will not reveal their HIV status. Curbing the HIV epidemic depends upon such innovative solutions.

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No competing financial interests exist.

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