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Charles H. Klein

Portland State University, charles.klein@pdx.edu

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WILLOW: Reaching HIV-positive African-American Women through a Computer-Delivered
Intervention

Authors:

Charles H. Klein¹
Carmela G. Lomonaco²
Rik Pavlescak³
Josefina J. Card²

Corresponding Author:

Charles Klein
Anthropology Department
Portland State University
P.O. Box 751
Portland, OR 97207
503-725-3316 (phone)
503-725-3905 (fax)
charles.klein@pdx.edu (email)

¹ Anthropology Department, Portland State University, Portland, Oregon

² Sociometrics Corporation, Los Altos, California

³ Comprehensive AIDS Program of Palm Beach County, West Palm Beach, Florida

² Sociometrics Corporation, Los Altos, California

Abstract: This study evaluates the efficacy of Multimedia WiLLOW in enhancing HIV-protective sexual behaviors and psychosocial outcomes among HIV-positive African American women, including condom use for vaginal and anal sex, and psychosocial mediators associated with risk reduction practices. Using a community-based randomized controlled design, 168 participants completed a baseline and follow-up assessment as well as an exit satisfaction survey. Intervention participants reported significantly higher proportions of condom protected sex acts in the past 30 days ($p=.002$), with both HIV-negative ($p=.040$) and HIV-positive ($p=.003$) partners. They were also more likely to report 100% condom use (OR = .10; $p=.030$); a lower adjusted mean of unprotected vaginal and anal sex acts in the past 30 days ($p=.002$); significantly greater sexual communication self-efficacy ($p=.004$); and less stress ($p=.012$). Participants rated Multimedia WiLLOW favorably in four satisfaction categories — enjoyment ($p<.001$); information utility ($p= .018$); information clarity ($p=.015$) and held attention ($p=0.010$).

Key Words: HIV-positive; risk reduction; African-American women; evidence-based programs; computer-delivered interventions

INTRODUCTION

African American women have been disproportionately affected by HIV/AIDS since the beginning of the epidemic. Over 63% of the estimated 310,000 women living with HIV/AIDS in the U.S. are African American, even though African Americans represent only 14% of the U.S. population (Centers for Disease Control and Prevention [CDC], 2009; 2011a; 2012a; 2012b; UNAIDS, 2010). In 2009, the rate of new HIV infection for African American women was fifteen times as high as that of white women and three times that of Hispanic/Latina women (CDC 2012b). At some point in their lifetimes, the CDC estimates that one in 32 African American women will be diagnosed with HIV (CDC, 2012b), and HIV disease is currently the third leading cause of death for African American women aged 35–44 (CDC, 2012b).

In response to the impact of the HIV/AIDS epidemic on African American women and other heavily affected communities, researchers and practitioners have developed nearly 70 interventions that have been scientifically demonstrated to be effective in reducing HIV risk related behaviors (CDC, 2011b). Several of these CDC-defined evidence-based programs specifically target African American women, including Wingood and DiClemente's popular suite of group level interventions for adult women (SISTA); HIV-positive women (WILLOW); adolescent females (SiHLE) and adolescent females seeking sexual health services (HORIZONS) (DiClemente et al., 2009; Wingood & DiClemente, 2006; DiClemente, Wingood & Harrington, 2004; Wingood et al., 2004; Wingood & DiClemente, 1998). The dissemination of these efficacious and culturally appropriate programs has been facilitated by the existence of user-friendly replication kits (CDC, 2008; Card et al., 2001) and trainings through the CDC's Diffusion of Evidence-based Interventions (DEBI) initiative (Danya International, 2012; Collins, Harshbarger, Sawyer & Hamdallah, 2006). Yet despite these resources, the widespread implementation of evidence-based HIV prevention interventions among HIV-positive African American women and other at risk communities has been impeded due to

financial constraints, staff and agency capacity, poor implementation fidelity, and recruitment and retention issues (Bell et al., 2007; Dworkin, Pinto, Hunter, Rapkin & Remien, 2008; Harshbarger, Simmons, Coelho, Sloop & Collins, 2006; Norton, Amico, Cornman, Fisher & Fisher, 2009; Rotheram-Borus, Swendeman & Chovnick, 2009).

Seeking to address these implementation challenges and expand the reach of evidence-based programs in severely impacted, isolated and hard to reach communities, Sociometrics Corporation has developed, with funding from the National Institute of Mental Health, computer-delivered versions of the SISTA/SiHLE/WILLOW HIV prevention trilogy. Each computer-delivered intervention is approximately 2 hours long and contains all the core elements of the original in-person, group-based intervention. Activities combine visual and audio presentations, interactive elements (e.g., games, quizzes, click and drag, role-plays, list creation), video recordings of group discussions from the original program, and a brief multimedia intervention tutorial so that users with limited computer literacy can easily use the programs. In recent randomized-controlled outcome studies, SAHARA [the computer-delivered version of SISTA] (Wingood et al., 2011) and Multimedia SiHLE (Klein and Card, 2011) both demonstrated preliminary efficacy in reducing HIV risk. For SAHARA, women in the intervention arm reported a significantly higher percentage of condom protected sex acts [intervention = 85.3% ($sd = 10.1$) versus control = 52.8% ($sd = 9.5$), $p = 0.03$] and were more likely to use condoms consistently for vaginal [OR = 5.9; $P < .04$] and oral sex [OR = 13.83; $P < .04$], compared to women in the control condition. For Multimedia SiHLE, average proportion of condom-protected sex acts (proportion of vaginal sex acts with condoms, last 3 months) for sexually active participants receiving Multimedia SiHLE rose from $M = 51\%$ at baseline to $M = 71\%$ at 3-month follow-up [$t = 2.06$, $p = .05$]; no statistically significant difference was found in the control group (Klein & Card, 2011). These findings support the idea that the computer-delivered interventions can positively influence HIV risk behaviors (see

also Noar, Black & Pierce, 2009) and contribute to reducing HIV infections and re-infections in at risk populations.

The objective of this study was to evaluate the preliminary efficacy of Multimedia WILLOW (Women Involved in Life Learning from Other Women) in enhancing HIV-protective sexual behaviors and psychosocial outcomes among HIV-positive African American women. The study also included a user-satisfaction survey to assess how women react to a computer-delivered education program and the extent to which the content addresses the realities of their lives. Like the original WILLOW program on which it is based (Wingood and DiClemente, 2006), Multimedia WILLOW was developed specifically for HIV-positive African American women and presents, within a gender/ethnic pride framework, detailed discussions of HIV re-infection, sexually transmitted infections (STIs) and key factors that have been linked to HIV risk behaviors among HIV-positive African American women, such as partner communication (Raiford, Wingood & DiClemente, 2007), condom self-efficacy (Crepaz & Marks, 2002), and HIV status disclosure (Kalichman, 2000; Kalichman, Rompa & Cage, 2005) (see Table I for a detailed description of the content of Multimedia WILLOW).

The intervention's focus on skills building, behavioral self-management and risk-reduction strategies is based on social cognitive theory and its emphasis on modeling in promoting and maintaining healthy behaviors (Bandura, 1994; Wingood et al., 2004). The program's extended exploration of social support builds on the theory of gender and power (Wingood & DiClemente, 2002a; Wingood & DiClemente, 2000) and its recognition that societal expectations of women as caregivers constrains their ability to access and expand social support networks (Wingood & DiClemente, 2004). This lack of social support can lead to stress and depression, which in turn makes sustaining safer sex behaviors more difficult, particularly given the significant economic and health challenges facing many African American women living with HIV (Belle, 1987; Raiford, Wingood & DiClemente, 2007; Wingood & DiClemente, 2004).

METHODS

Study design

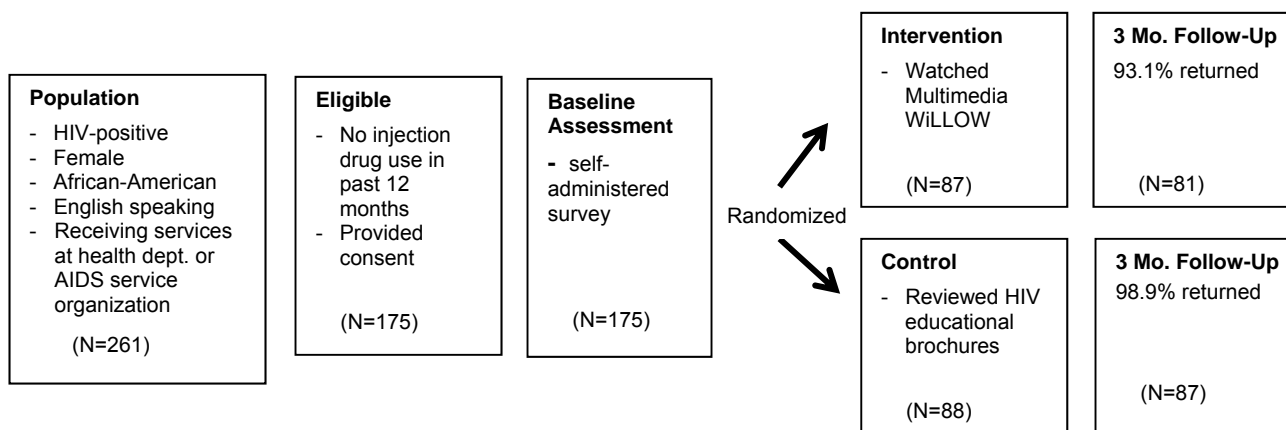
The study used a randomized controlled design conducted through a health department (two sites) and a community-based AIDS service organization (four sites) which provide services to HIV-positive African American women in a southern state with high HIV prevalence. To be eligible to participate women were required to be HIV-positive, African American, English speaking and between the ages of 18 and 50. Because neither WILLOW nor Multimedia WILLOW discusses injection drug related risks in any detail and HIV-positive injection drug users may have different HIV prevention needs than non-injection drug users, eligible participants were also required to not have reported injecting any illicit drug in the past 12 months.

Upon approval from Sociometrics' Institutional Review Board, all study staff at the recruitment sites received a full day, face-to-face training on study procedures and human subject protections and completed the NIH human subject protections online training. During May to July 2011, case workers and other health-care professionals working with HIV-positive African American women at all six sites recruited eligible participants by verbally describing the study and handing out recruitment flyers. The flyer provided a brief overview of the study, participant expectations, and an invitation to call study recruiters to enroll in the study. Upon participant-initiated contact, study recruiters at each site scheduled eligible women for their first session, at which time they were directed to a private room and provided their written informed consent. Prior to enrollment, a randomization scheme was created using computer-generated block randomization in which participants were assigned to either multimedia WILLOW (intervention condition) or an HIV prevention brochures review (standard of care control condition) via sealed opaque envelopes using a 1:1 intervention-to-comparison randomization allocation. Study recruiters and coordinators were blinded to which condition (intervention or

control) the participant had been assigned until they opened the envelope at the start of the participant's designated timeslot.

Once randomized into either the intervention or control arm, all participants completed a baseline assessment, watched Multimedia WiLLOW (intervention condition) or reviewed HIV education brochures for people living with HIV (control condition), and completed a ten minute exit assessment addressing their impressions of their respective study condition. Of 261 women initially recruited, 175 (67%) were determined to be eligible and consented to participate in the study (see Figure 1). Three months later, participants returned for the follow-up assessment. Retention rates for both conditions were high with 93.1% (N=81) in the intervention condition and 98.9% (N=87) in the control condition completing the follow-up. Participants received \$75 for completing the first session and \$50 for completing the follow-up assessment.

Figure 1. Recruitment, Allocation and Retention of Study Participants



Hypotheses

The study's main hypotheses were that, relative to the control condition, women in the Multimedia WiLLOW condition at follow-up would have (1) an increase in the percentage of condom use during vaginal and anal sex acts, and (2) a greater number of participants reporting 100% condom use for vaginal and anal sex. It was also hypothesized that, relative to the control condition, the Multimedia WiLLOW condition would report improvements in psychosocial

mediators and factors theorized to be linked to risk reduction behaviors, such as stress, self-esteem, social support received, condom self-efficacy, and partner communication behaviors and skills.

Measures

Data collection occurred at baseline and at a 3-month follow-up via pen and paper. The baseline and follow-up assessments were identical and assessed sociodemographic characteristics, psychosocial mediators, HIV/AIDS prevention knowledge, and alcohol and substance use in past 30 days. Sexual behavior questions included total number of partners by HIV status (i.e. positive, negative, unknown) in the past 90 days; vaginal and anal sex with and without condoms in the past 30 days, by partner status and type (i.e. primary or non-primary); and condom use and substance use at last vaginal or anal sex event in the past 30 days.

Behavioral Outcomes

The primary behavioral outcomes were (1) 100% condom use for vaginal and anal sex, and (2) percentage of condom protected vaginal and anal intercourse. Condom use frequencies were calculated based on self-reported sexual behavior in the past 30 days, as collected in the baseline and three month follow-up assessments. The behavioral outcomes were analyzed for all vaginal and anal sex partners aggregated, as well as by partner HIV status and type.

Psychosocial Mediators

Psychosocial mediators were derived from the intervention's underlying theoretical framework and a review of the literature on African American women and HIV, with the goal of capturing potential changes in mental health and social support linked to HIV risk reduction practices. All constructs, excepting the condom use self-efficacy scale (see below), were assessed using scales with satisfactory psychometric properties developed in previous evaluations of face-to-face and computer-delivered versions of the SISTA/SiHLE/WILLOW trilogy (DiClemente & Wingood, 1995; DiClemente, Wingood & Harrington, 2004; Wingood & DiClemente, 1998; Wingood & DiClemente 2002b, Wingood et al., 2004).

Knowledge and Condom Use Self-Efficacy

HIV transmission risk knowledge was measured using 9 true/false questions, with high scores indicating greater knowledge. Condom use self-efficacy ($\alpha = .90$) was assessed using the condom use self-efficacy scale (CUSES), a 28-item validated instrument that has been extensively used in HIV prevention behavioral studies (Dilorio, Maibach, O'Leary & Sanderson, 1997). Higher scores indicate greater self-efficacy in using condoms correctly.

Partner Communication and Mental Health

An 8-item partner communication scale ($\alpha = .80$) assessed women's ability to negotiate safe sexual practices with their partners, with higher scores indicating greater partner communication efficacy. A 4-item scale addressed women's actual sexual communication behaviors with their partners, with higher scores indicating more communication on HIV risk reduction practices ($\alpha = .60$). General mental health variables shown in the literature to affect women's safer sex practices were assessed using a 14-item stress scale ($\alpha = .84$); a 10-item self-esteem scale ($\alpha = .80$); and an 18-item coping scale ($\alpha = .70$).

Social Support

Twenty-three questions addressed social support HIV-positive women may receive from family, friends, and clinic staff (e.g., doctors, nurses, or social workers) in five domains – practical (6 questions), emotional (5 questions), decision-making (5 questions), HIV-related support (6 questions) and overall 1 (question). Items included yes/no questions that addressed specific forms of social support (e.g. "If you had some questions about your health, like what you should eat or what medications you should take, is there someone who could give you some information?"; "If you had to be hospitalized for a few days because of your HIV-related illness, is there someone who would help you?"; "Is there someone who really understands you, your feelings, and what your life is like?"). Likert-scale questions addressed the frequency with which different types of social support were needed and received, with respondents also indicating the number of people who provided each type of social support.

User Satisfaction

Participants completed a 23-item user satisfaction survey immediately after viewing Multimedia WILLOW (intervention) or reading the HIV educational pamphlets (control). The user satisfaction included Likert-like scale questions on program quality (i.e. overall design, ease of use, usefulness of information, potential to help people lower their sexual health risks) and experience with the program or brochures (e.g., enjoyment, held attention, clarity of presentation, interactivity and length of activities [intervention arm only]). Open-ended questions addressed overall impressions, likes and dislikes, new information learned and suggestions for improving the program or brochures.

Statistical Analyses

At baseline, descriptive statistics were calculated for sociodemographic variables, mediators and sexual behaviors. Differences between conditions were assessed using *t* tests for continuous variables and χ^2 for dichotomous variables (Fleiss, Levin & Paik, 2003). Linear regressions and logistic regressions were used to assess HIV intervention effects at the 3-month follow-up. These models included a time-independent variable (study condition) and time-dependent variables (covariates and outcomes). Variables for which differences between study conditions were statistically significant (approaching the $p < .05$ level) were included as covariates in the models. Estimates were adjusted for the corresponding baseline measures for each outcome and other covariates in the model to obtain (1) adjusted mean differences to assess the effect of the intervention on continuous variables and (2) adjusted odds ratios (ORs) to assess the effect of the intervention on dichotomous variables. The 95% confidence intervals (CIs) and corresponding *P* values were also computed. Percentage of relative change for continuous variables was computed as the difference between the adjusted means for intervention and control conditions divided by the adjusted mean for the control condition. Percentage of relative change provides a common measure of the magnitude of change across

the different scale measures relative to the baseline measure (Wingood et al, 2004). Analyses were made using SPSS Statistics 20.

RESULTS

In total, 175 HIV-positive African-American women provided written informed consent and enrolled in the study. Eighty-seven (49.7%) were randomly assigned to the computer-delivered WiLLOW condition, and 88 (50.3%) to the HIV education brochure control condition. No differences in baseline sociodemographic characteristics were observed between participants retained in the trial compared with those unavailable for the follow-up assessment.

Baseline Analyses

At baseline, participants had an average age of 40.7 years (SD = 8.5) and had been living with HIV for an average of 11.3 years (SD = 7.4 years), with 12.5% having received their HIV diagnosis within the past two years. Eighty-five percent had at least one child ($M=2.4$ children), and most were single (63.0%) or divorced/separated (18.5%). Over one-third (36.9%) of participants had not completed high school, while 26.2% had a high school diploma, 16.7% had completed some college, and 8.9% had a vocational degree. Three-quarters did not work, and most women reported incomes below the poverty level (38.7% reported incomes of less than \$6,000 per year, 29.8% \$6,001 -12,000/year; and 10.7% \$23,001 - \$45,000/year).

On average, participants described themselves as having good to very good overall health on a 5-point Likert-like scale ($M = 3.39$, where 1 = poor, 3= good, 5 = excellent). Almost half (45.8%) reported being limited by a major health impairment, with HIV topping the list (32%), followed by walking troubles (22%), depression (21.4%), back/neck pain (20.2%), eye/vision problems (19.6%) and hypertension (18.5%). On average, participants reported 6.5 days/month in which their health was not good; 9.7 days/months when their mental health was not good; 9.8 days/months of feeling depressed; 10.8 days/month of feeling anxious; and 12.7 days/months of not getting enough rest.

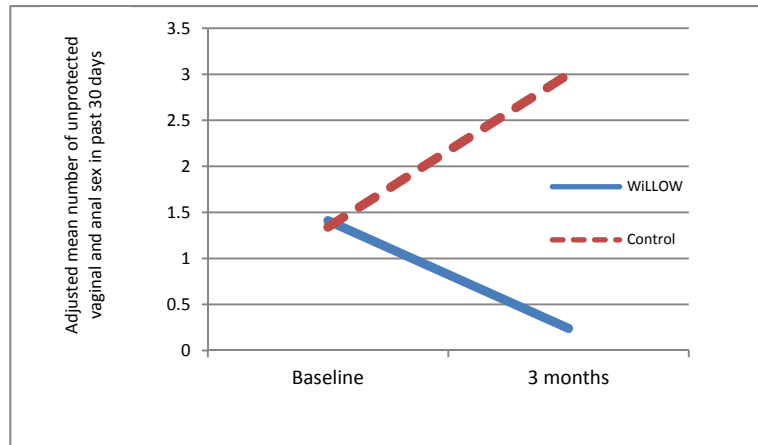
Ninety-five percent of participants had disclosed their HIV status to another person, most often their social worker (58.9%), sister (53.0%), mother (51.8%), brother (50.6%) or daughter (42.3%). Participants reported less frequent disclosure to their sons (35.7%) or fathers (26.8%). The average time from discovering their HIV status to disclosing for the first time was 6 months, with most women (58.3%) disclosing within less than a month of finding out they were HIV-positive. The most commonly reported substances used in the past month were alcohol (42.9% of participants, $M=6.2$ days used and $M=2.7$ drinks per day), marijuana (13.7% of participants, $M=14.1$ days used and $M=5.0$ times per day), and crack cocaine (4.2% percent of participants, $M=9.3$ days used and $M=3.7$ times per day).

Statistically significant differences (approaching the $p<.05$ level) between the intervention and control conditions were observed for the number of HIV-negative partners, the number of vaginal or anal sex acts with condoms with primary partners, and having someone to confide in about being HIV-positive (see Table II). These three variables were included as covariates in the linear regression and logistic regression analyses. No other significant differences at baseline were observed for the sociodemographic characteristics and the remaining mediators and outcome measures.

Effects of the Intervention on Sexual Behaviors

Effects of the intervention on the primary behavioral outcome, unprotected vaginal or anal sex, are presented in Table III and Figure 2. Compared with participants in the control condition, adjusted for covariates, Multimedia WiLLOW participants had a significantly higher proportion of condom protected sex acts in the past 30 days (mean difference = .33, $p=.002$). This greater percentage of condom use occurred with both HIV-negative (mean difference=.31, $p=.040$) and HIV-positive (mean difference = .48, $p=.003$) partners. Women receiving Multimedia WiLLOW were also more likely to report 100% condom use (OR = .10; $p=.030$) and had a lower adjusted mean number of unprotected vaginal and anal sex acts in the past 30 days (mean difference = -3.41, $P=.002$).

Figure 2. Intervention Effects on Number of Unprotected Vaginal and Anal Sex (past 30 days)



Effects of the Intervention on Psychosocial Mediators

In comparison to women in the control condition, adjusted for covariates, Multimedia WILLOW participants reported significantly greater sexual communication self-efficacy (mean difference = 3.4, $p=.004$), and less stress (mean difference = -4.32, $p=.012$), and communication with partners on HIV risk reduction practices approached significance (mean difference = .6, $p=.051$). There were no significant differences between the intervention and control conditions on condom self-efficacy, HIV prevention knowledge, coping, self-esteem, control of life, or social support variables.

User Satisfaction

Participants rated the computer-delivered intervention more favorably than the HIV education brochure control in the four principal satisfaction categories — enjoyment (4.69 v. 4.26, $p<.001$), information utility (4.76 v. 4.56, $p=.018$), information clarity (4.81 v. 4.58, $p=.015$) and held attention (4.68 v. 4.41, $p=0.010$). More Multimedia WILLOW than control participants also reported having learned something new (96.6% v. 74.8%, $P < .001$) and thinking that other African-American women would be interested in the prevention education they received (6.43 v. 5.92 on a 1-7 Likert-like scale, $p=.016$).

DISCUSSION

This is the first study to demonstrate that a computer-delivered intervention can reduce HIV transmission risks and enhance psychosocial mediators associated with HIV preventative behaviors among African American women living with HIV. The findings add to a growing literature demonstrating the effectiveness of computer-delivered HIV prevention programs in reducing sexual health risks in diverse populations (Noar, Black & Pierce, 2009). The fact that the intervention demonstrated increases in condom use with both HIV-negative and HIV-positive partners suggests that the program can help decrease new HIV infections and HIV re-infection, as well as sexually transmitted infections more generally. The findings of increased 100% percent condom use and proportion of condom-protected sex acts are also noteworthy because most of the sexually active participants in the study described themselves as being in a committed relationship with their partners, which can be a barrier for women trying to implement safer sex practices (Wingood & DiClemente, 2000).

The intervention's efficacy may derive from its modeling of gender empowerment and effective communication, as demonstrated by the increase in partner communication self-efficacy and reductions in stress among Multimedia WiLLOW participants. The efficacy may also be partly attributable to the intervention's gender-tailored content that directly addressed the structural and psychosocial factors that affect the ability of women living with HIV to practice safer sex and lead healthy lives. The relevance of the intervention's gender/ethnic pride framework is supported by the finding that women in both the intervention and control conditions were more likely to have disclosed their HIV status to female than male relatives, suggesting that these female social support networks can play an important role in promoting healthy behaviors and HIV/STI risk reduction among African American women living with HIV. The appropriateness of this broad HIV prevention approach was further confirmed in the user satisfaction survey, with participants strongly agreeing Multimedia WiLLOW would be of interest to other African-American women living with HIV and would help them lower their sexual health risks.

Implementing the multimedia WiLLOW program requires relatively few resources, which many community based organizations and health departments serving HIV-positive African American women would have readily available. Staff would only require minimal training to implement the program. Other factors suggest the likelihood of sustained uptake in clinical settings. The program is flexible: HIV-positive African American women could participate in the program on an impromptu basis when they are in a medical facility or social services office, or they could be asked by their case worker or medical provider to participate in the computer-delivered WiLLOW program as a part of their ongoing support services.

The versatility of multimedia WiLLOW is reflective in the potential uses during the provision of service and treatment to those living with HIV. The multimedia WiLLOW program could be used as a sole program or as part of a larger set of HIV support services. Clients/patients may review the entire program periodically as a booster or clients/patients may watch segments that address important prevention issues (e.g. sexual communication, re-infection and social support) that emerge in the delivery of services to individuals living with HIV. With its focus on social support, multimedia WiLLOW may also lead participants to seek other HIV prevention or treatment adherence interventions. Additional research could assess whether these different viewing patterns (e.g. at a clinic or at home, in one sitting or in several sittings, repeated viewing of particular sections) affect intervention efficacy.

This study is not without its limitations. First, the findings may not be applicable to women with different risk profiles, such as those injecting illicit drugs who are not represented in the study. The sociodemographic variables represented within our sample are reflective of the populations served by the study sites and the target audience for the multimedia WiLLOW program. And although the study's population represents the neediest population in terms of prevention and other social services, further research with a wider sample of HIV+ African American women would allow for a deeper understanding for how multimedia WiLLOW may support women of all economic backgrounds (e.g. middle class), age ranges (e.g. young adult)

and different risk profiles (injection drug use). A second concern is the reliance on self-reported data for the primary outcome measure, though prior research has established the validity and reliability of self-reported data (Jaccard & Wan, 1995). A third limitation is the relatively short three month follow-up. Another potential study limitation which would also affect generalizability is selection bias. Given our extremely high retention rates at follow-up, the ability to determine any drop-out bias was not possible. Steps or measures were taken during the recruitment and retention procedures to avoid any self-selection bias related to willingness or availability to participate.

CONCLUSION

Computer-delivered interventions such as Multimedia WILLOW offer an effective, cost-efficient, engaging and easily scaled up method to take the content of proven group level interventions to at-risk populations in multiple settings, including clinics, community and faith-based organizations, correctional facilities and private residences. With the new national focus on “High Impact Prevention” (HIP) (CDC, 2011c), multimedia WILLOW may indeed be utilized with populations in need of maximized prevention efforts, such as HIV-positive African American women. This study suggests that after reviewing multimedia WILLOW, women feel motivated or empowered to seek additional support services and in some cases, may even be willing to provide peer support to other women in programs such as treatment adherence programs.

Given the efficacy and accessibility of computer-delivered interventions, more of these culturally tailored programs should be developed to ensure that other vulnerable populations continue to receive effective HIV/STI prevention education in our current budgetary challenged times.

Table I
Multimedia WiLLOW Content

| Face-to-Face WiLLOW | Multimedia WiLLOW |
|--|---|
| Session 1 – Pride, Values & Goals: Using Social Support | Session 1 – Change What You Think, Change What You Do |
| 1. Welcome, introductions, and ground rules. WiLLOW motto. | 1. Narrated introduction, poem, tutorial on how to use mouse and program. WiLLOW motto, introduction of Sistas (video clips). |
| 2. Discussion of positive aspects of being an African American woman and identification of African American women role models. | 2. Thought questions presented in text and audio formats; after each, screen freezes for user to reflect on their responses. User can also click on photos to see/hear the responses of other African American women. |
| 3. Personal values clarification activity—participants identify values most important to them. | 3. Presentation followed by interactive exercise in which user prioritizes values by clicking and dragging them. Thought questions are presented; and video clip shows other African American women discussing their values and how they have changed in the face of HIV. |
| 4. Goal setting: Making contracts with self for long- and short-term goals. | 4. Users set a short-term and a long-term goal and enter them on the screen. Discussion of importance of providing rewards for achieving goals; users enter a reward for each goal. Creation of customized goals and rewards page. |
| 5. Introduction to social support: Who loves you, Who do you love? | 5. Introduction of social support and interactive activity to create visual depiction of people in the viewer's support network. |
| 6. Types, benefits and qualities of social support. | 6. Series of screens presents types of social support (i.e. emotional, informational, practical) in text, icons, and audio. Video clips of Sistas discussing social support in their lives. |
| 7. Who is in your support network? | [See 5. above] |
| 8. Informational support, practical support and emotional support: What are they, what are the barriers? | 7. Series of screens presents a discussion of the barriers to accessing different types of social support. |
| 9. Developing a resource list and saying thanks to those who help. | 8. Presentation about having a list of people to turn to for different types of assistance and methods of thanking helpers in appropriate ways. |
| 10. Session review. | |
| Session 2: Stress Management: Changing What You Think, Changing What You Do | |
| 1. Welcome, motto, review, thought for the day. | |
| 2. Stress: What is stress? The effects of stress, coping with stress, determining if a situation is changeable. | 9. Health educator discusses stress and its impacts on the body of someone living with HIV (augmented with audio and visuals); learning to manage stress, learning that values and resources can influence how we respond to stressors. |
| 3. RELAX model for coping with stress. | 10. Via narration with visuals, viewer is introduced to relaxation techniques. |
| 4. Express yourself: Express anger, let others in on the problem, allow positive thoughts. | 11. Video clips of Sistas discussing coping with stress through RELAX model. |
| 5. Let's exercise! | |
| 6. Passive, aggressive & assertive Communication | 12. Narrative discussion of different communication types and video clips of Sistas reenacting each of the three communication styles. |

| | |
|---|---|
| 7. Calling your social worker | |
| 8. Relationships and communication: Role play | 13. Quiz in which viewers match audio clips with one of the three communication types. |
| 9. Coping with stress: the DECIDE model | 14. Mouse-over activity introducing the DECIDE model for problem solving/stress reduction. |
| 10. Goal setting and session review. | 15. Brief review and reminder to return for session 2. |
| Session 3: Risk Reduction & Condom Use Management | Session 2: Risk Reduction, Condoms and Relationships |
| 1. Introduction & thought for the day. | 1. Poem and introduction. |
| 2. Facts about STIs and HIV reinfection. | 2. Click and drag activity to convey definitions, symptoms and treatment for seven STIs, including HIV. Narration with visuals on STI transmission, symptoms, treatment, and prevention strategies. Interactive quiz reinforces STI knowledge acquisition. Narration with visuals on HIV transmission/reinfection facts and misconceptions and importance of HIV-positive women using condoms. Interactive quiz reinforces HIV reinfection knowledge. |
| 3. Card swap game depicts how STIs and HIV are transmitted. | 3. Video clip of women engaging in a game showing how STI/HIV transmission occurs, followed by discussion of risks associated with different sexual activities. |
| 4. How to talk condoms with your (reluctant) man. | 4. Interactive activity to align “condom excuses” with appropriate responses. |
| 5. WILLOW quiz show (review of first three activities in session 3). | 5. WILLOW Jeopardy game, with African American game show host, in which viewer selects question categories, points. Both correct and incorrect answers provide information related to the correct responses. |
| 6. Condom management: Doing it right, do(s) & don’t(s) of condom use; practice makes perfect. | 6. Health educator demonstrates four steps to proper condom use using penis model. Video of African American women practicing and coaching one another on proper condom use. |
| 7. Doing it in the dark: condom practice blindfolded. | |
| 8. Safe sex is hot sex; alcohol & sex: not a good mix. | |
| 9. Learning from each other: Sharing stories about using condoms consistently. | 7. “Safe sex stories” videos clip of women discussing importance and benefits of consistent condom use. |
| 10. Goal setting | |
| Session 4: Building Healthy Relationships & It’s Your Turn | |
| 1. Introduction and review | |
| 2. What do healthy relationships look like? | 8. Presentation with visuals and audio on qualities of healthy and unhealthy relationships. |
| 3. Is this a healthy relationship? What does abuse look like? | 9. True/false quiz on qualities of healthy and unhealthy relationships. |
| 4. The Power Pie | 10. Mouse-over activity explores the power pie for abusive relationships; thought questions with screen freeze for reflection. |
| 5. Talk or walk: breaking up is hard to do | 11. Narration with visuals on warning signs of relationship violence and getting help in violent situations. |
| 6. Session review | 12. Review and closure. |

Table II. Comparability of the Multimedia WiLLOW Intervention and the Control Comparison Groups

| Characteristic | WiLLOW Intervention (n=87) | | Control Comparison (n=88) | | P |
|--|-------------------------------|-------------|------------------------------|-------------|-----|
| | Mean (SD) | Percent (%) | Mean (SD) | Percent (%) | |
| Sociodemographic | | | | | |
| Age | 39.5 (9.3) | | 41.8 (8.0) | | .09 |
| High school education or less | | 65.4 | | 64.0 | .62 |
| Not married/no long-term partner | | 89.9 | | 80.5 | .22 |
| # of children | 2.2 (1.8) | | 2.6 (1.8) | | .18 |
| Live alone or self + children | | 48.2 | | 48.4 | .41 |
| Income less than \$12,000/year | | 66.7 | | 70.2 | .31 |
| Not employed | | 80.2 | | 72.4 | .29 |
| Have health insurance | | 66.7 | | 64.4 | .74 |
| Year of HIV diagnosis | 2000 (7.4) | | 2000 (7.6) | | .94 |
| Psychosocial mediators | | | | | |
| Stress (range, 14-70) | 37.1 (13.1) | | 36.3 (11.4) | | .67 |
| Coping (range, 18-90) | 59.9 (8.6) | | 62.6 (9.5) | | .09 |
| Self-esteem (range, 10-50) | 39.2 (7.8) | | 38.6 (7.4) | | .65 |
| HIV transmission risk knowledge (range, 0-9) | 8.0 (.93) | | 7.8 (1.2) | | .17 |
| Condom use self-efficacy (range, 27-135) | 119.1 (14.0) | | 117.9 (17.3) | | .65 |
| Communication self-efficacy (range, 8-40) | 32.9 (6.0) | | 34.6 (5.9) | | .08 |
| Structural factors | | | | | |
| Having someone to confide in about HIV | | 70.4 | | 85.5 | .02 |
| Overall social support (1-5) | 3.4 (1.3) | | 3.5 (1.2) | | .38 |
| Sexual and Communication Behaviors | | | | | |
| Had sex with steady partner, past 3 months | | 55.6 | | 55.8 | |
| Had sex with casual partner, past 3 months | | 18.1 | | 21.9 | |
| Number of sex partners, past 3 months | 0.96 (.72) | | 1.6 (6.5) | | .39 |
| Number of HIV-negative sex partners, past 3 months | 0.56 (.59) | | 0.35 (.53) | | .02 |
| # times vaginal or anal sex with condoms | | | | | |
| with steady partner past 30 days | 2.8 (4.4) | | 5.6 (8.0) | | .06 |
| Number unprotected vaginal and anal intercourse | 1.4 (2.7) | | 1.3 (3.4) | | |
| In past 30 days | | | | | .92 |
| Sexual communication behaviors (scale, 4-16) | 10.8 (1.7) | | 11.1 (1.6) | | .28 |

Table III. Effects of HIV Intervention on Self-Reported Condom Use and Related Psychosocial Condom Use Mediators

| | Unadjusted mean (SD) | | Adjusted* Mean Difference (D) or Odds Ratio (95 CI%) | % Relative Change [‡] (95% CI) | P |
|--|-------------------------|---------------|---|--|-------|
| | I | C | | | |
| <i>Sexual Behavior</i> | | | | | |
| Prop. condom use, vaginal/anal sex, past 30 days, all partners | .89 (.30) | .73 (.42) | .33 (.13, .52) | 45.21 (17.67, 71.36) | .002 |
| Prop. condom use, vaginal/anal sex past 30 days, HIV-negative partners | .89 (.29) | .79 (.43) | .31 (.02, .61) | 39.24 (1.14, 88.72) | .040 |
| Prop. condom use, vaginal/anal sex, past 30 days, HIV-positive partners | 1.0 (0) | .72 (.39) | .48 (.20, .75) | 66.67 (27.98, 104.91) | .003 |
| # unprotected vaginal/anal sex past 30 days | 0.24 (.54) | 3.00 (6.18) | -3.41 (-5.54, -1.29) | -133.67 (-190.20, -41.71) | .002 |
| 100% condom use, vaginal/anal sex, past 30 days | 90.6 | 50.0 | .10 [†] (.01, .80) | na | .030 |
| <i>Partner Communication (sexual)</i> | | | | | |
| Sexual communication scale | 11.49 (1.29) | 11.0 (1.56) | 0.60 (.00, 1.20) | 5.45 (0.00, 9.71) | .051` |
| <i>Psychosocial Mediators</i> | | | | | |
| Communication self-efficacy scale | 36.11 (3.97) | 35.03 (5.92) | 3.40 (1.12, 5.65) | 9.70 (2.08, 21.77) | .004 |
| Stress scale | 31.69 (10.75) | 35.77 (10.26) | -4.32 (-7.64, -.99) | -12.08 (-13.72, -3.76) | .012 |

* Adjusted by covariates: corresponding baseline variable, having someone to confide in about HIV, number of HIV negative sex partners in past 3 months, number of times used condoms with steady partners for vaginal/anal sex past 30 days

† Adjusted odds ratio calculated with the comparison condition as the referent (OR = 1.0)

‡ % Relative Change (RC) = [D/C x 100%] and 95% Confidence Interval around the % relative change*

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