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AN INTERVENTION TO ASSIST MEN WHO HAVE SEX WITH MEN DISCLOSE THEIR SEROSTATUS TO CASUAL SEX PARTNERS: RESULTS FROM A PILOT STUDY

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Abstract

This article reports pilot data from a newly developed disclosure intervention and associated measures specifically tailored for disclosure to casual sexual partners. Treatment consisted of a four-session, theoretically driven intervention focusing on the costs and benefits of disclosure. Using a randomized control, crossover design 77 men were randomized into one of three conditions (wait-list control, facilitator only, and computer and facilitator). Results of the study suggest that facilitated administration of the pilot intervention was effective in reducing mean scores on the HIV disclosure behavior and attitude scales and that these reductions were both statistically and practically significant.

Men who have sex with men (MSM) remain disproportionately represented in national HIV/AIDS statistics. Currently, 69% of all adolescent/adult HIV diagnoses involve males and 49% of these cases can be traced exclusively to male-to-male sexual contact (Centers for Disease Control and Prevention [CDC], 2007). Despite widespread educational campaigns and interventions, only minimal progress has been made in curbing rates of HIV transmission among MSM (CDC, 2007). Some MSM are engaging in risky behaviors that continue to place them at risk for contracting HIV or further spreading the virus.

Nondisclosure of an HIV-positive status may be a key contributor to HIV transmission because it may leave partners with a false sense of security when engaging in risk-related behaviors. Willingness by a potential partner to engage in unprotected sex without disclosure of a negative status may be interpreted by some HIV-positive persons as a sign that the partner is positive. Studies have reported MSM disclose more frequently to partners of known serostatus than unknown status, which could increase risk of exposure if they decide to engage in risky sexual activity (De Rosa, & Marks, 1998; Marks, Richardson, & Maldonado, 1991). HIV serostatus disclosure occurs least frequently with casual partners and partners of unknown serostatus (Courtenay-Quirk, Wolitski, Parsons, Gomez, & the Seropositive Urban Men's Study Team, 2006; Poppen, Resisen, Zea, Bianchi, & Echeverry, 2005; Semple, Zians, Grant, & Patterson, 2006).

Extant research regarding the relationship between HIV disclosure and risky sexual behavior has produced mixed results (Simoni & Pantalone, 2005). Some researchers suggest that

disclosure does not result in safer sex. Marks and Crepaz (2001), examining data from homosexual, bisexual, and heterosexual men, found that the prevalence of safer sex was not significantly higher among disclosers than nondisclosers; nonetheless, disclosers were more likely to engage in safer sex. Other researchers have examined factors such as gender, relationship to the partner, condom usage and seroconcordance with mixed results. For example, in one study of men and women, a significant association between increased condom usage among those who disclosed was found for men but not women (Kalichman & Nachimson, 1999). In another study increased disclosure was positively correlated with increased condom use among nonprimary partners; however the results for primary partners showed no association (Zea, Reisen, Poppen, Echeverry, & Bianchi, 2004). Significant relationships have emerged in the literature regarding seroconcordance or discordance and disclosure (Courtenay-Quirk et al., 2006; Poppen et al., 2005; Semple et al., 2006; Zea et al., 2004). It is important to note that the relationship between seroconcordance and risky sex is usually confounded, depending on whether explicit disclosure occurred or was even measured.

Another body of literature supports an explicit relationship between disclosure and safer sex (Morin et al., 2005; Parsons et al., 2005). In one study not disclosing to all sexual partners was a significant predictor of risky sexual behavior for both primary and nonprimary partners (Morin et al., 2005). Kalichman's Healthy Relationships (Kalichman, 2005; Kalichman et al., 2001; Kalichman, Rompa, & Cage, 2005) intervention for HIV-positive men and women focused on disclosure and showed that an intervention emphasizing disclosure could lead to significant reductions in sexual risk. A consistent finding in recent studies is that when disclosure involves explicit sexual communication safer sex is more likely to occur (Simoni & Pantalone, 2005). In fact some have concluded that disclosure results in safer sex only when in conjunction with sexual communication. For example, Crepaz and Marks (2003) found that men who disclosed their serostatus to an at-risk partner and explicitly discussed safer sex were significantly more likely to engage in safer behaviors than those who only disclosed. However, they also found that disclosure was associated with an increased likelihood of discussing safer sex with one's partner. The strongest evidence regarding the importance of disclosure in reducing HIV transmission comes from a study by Pinkerton and Galletly (2007) who found that "under base-case assumptions, serostatus disclosure reduced the risk of HIV transmission by between 17.9% and 40.6% relative to no disclosure" (p. 698). They further asserted that "increasing the disclosure rate from the base-case value of 51.9-75.7% produced a 26.2-59.2% reduction in risk" (p. 698). Furthermore, numerous authors have called for intervention efforts to assist men with the serostatus disclosure (Morin et al., 2005; Parsons et al., 2005; Pinkerton & Galletly, 2007).

Until now no intervention has taught men disclosure skills and then followed their sexual activity over time while measuring risk on the encounter level. Therefore, although these crosssectional studies are important, a stronger test of the association between disclosure and safer sex has yet to be employed. Until such studies are conducted, ambiguity regarding the relationship between disclosure and safer sex will remain.

The purpose of this project was to develop and test a disclosure intervention and associated measures specifically tailored for disclosure to casual sexual partners. The consequences theory of disclosure was the guiding theory for the development of the intervention. The theory purports that disclosure typically occurs once the rewards for disclosing outweigh associated costs (Serovich, 2001). Two primary research questions guided the analysis for this study: (a) Does the intervention significantly affect the disclosure behaviors, attitudes and intentions of participants? and (b) Does the intervention affect the risk of unprotected anal intercourse reported by participants?

METHODS

RECRUITMENT AND PARTICIPANTS

Participants were recruited in two ways. The first was through advertising at local AIDS service organizations (ASOs). Caseworkers were informed of the study and were provided information about the project that they could distribute via flyers or through newsletters. Second, recruitment materials were made available at various HIV-related venues and forums (e.g., AIDS Walk and Gay Pride festivities) held in the community. Recruitment efforts resulted in a sample of 77 eligible HIV-positive, adult MSM from a large Midwestern city. Eligible participants were those 18 years or older who had, within the past 3 years, engaged in sexual behaviors that resulted in a decision about whether to disclose their serostatus. For this study, men who exclusively had sex with women, could not speak and understand English, and those under the age of 18 years were excluded. All participants were provided bus fare and/or money for parking and served light refreshments during their participation. Phase I participants were compensated \$40 for the individual interview and \$50 if they participated in the focus group. Phase II participants were compensated \$25 at each data collection point. Consent for participation was received from all participants according to institutional procedures for the protection of human subjects.

Fifty-two percent of participants were Caucasian, 37% were African American, and 11% were either Hispanic/Latino or Native American. Approximately 19% of the participants were high school graduates; 73% of participants had either completed some college or had graduated college. Only 8% of participants had not completed high school. Seventy-four percent of participants were employed and approximately one third of all participants reported monthly earnings of \$500 per month or less.

EXPERIMENTAL PROCEDURES

Phase I of the study involved individual interviews with HIV-positive MSM concerning their experiences with disclosure/nondisclosure decisions. Twenty-three MSM who had told “none/few,” 14 who had told “some,” and 20 who had told “most/all” of their casual sexual partners were interviewed regarding their three most recent sexual encounters in which a disclosure decision had to have been made. Costs and benefits of disclosure were gleaned from the interview data as well as motivators for and against disclosure and strategies used. Focus groups were convened as a participatory approach to coding and to inform intervention development. In the second phase of the study, a four-session pilot intervention was developed and tested.

Session 1 of this intervention included an introduction to the project, goal setting, an assessment of disclosure strategies or tactics utilized, and disclosure triggers (e.g., partner age or attractiveness). Session 2 focused on the costs and benefits of disclosing and exercises designed to minimize costs and maximize benefits. Session 3 focused on the evaluation and testing of different strategies for disclosing as well as strategies for managing reactions. Session 4 was a continuation of the session 3 activities with an additional focus on learning more strategies and rehearsal. The intervention also included a 3-month follow-up data collection session. The intervention and associated measures were pilot tested utilizing a three-armed, randomized control, crossover design. This included a wait-list control and two experimental arms (facilitator only and computer and facilitator). Participants in the facilitator group completed all intervention materials and exercises face-to-face while participants in the computer-and-facilitator group completed initial assessment and paper- and-pencil exercises electronically with the remaining activities completed with a facilitator.

Randomization resulted in 21 persons being wait-listed and later crossed over to either condition. A total of 40 participants completed the facilitator-only treatment, and 37

participants completed the computer and facilitator treatment. Participants were predominately Caucasian (53%) men between the ages of 19 and 60 ($M = 40$ years). The sample was primarily single (71%) and partnered in an open relationship (22%).

MEASUREMENT

The primary outcomes for this study included disclosure behaviors, attitudes and intentions. An author-derived instrument comprising three 13-item scales, one for each of the primary outcomes, was developed in conjunction with the intervention and was applied to the measurement of experimental effects. Data were collected pre intervention, immediately postintervention, and three months postintervention. To assess attitudes, the stem for each item began with the phrase, "I should disclose when . . . [specific sexual situation]." For the assessment of intention, the stem was modified to read, "I intend to disclose when . . . [specific sexual situation]." For the assessment of disclosure behavior, the stem was modified to read, "I disclosed when . . . [specific sexual situation]." Each component scale item employed a 5-point Likert-type scale. In the measurement of attitudes and intentions, participants were required to select Likert-responses ranging from "strongly disagree" to "strongly agree." Scale responses were modified for the behavior items, where participants were required to select from five frequency-based alternatives (1 = none, 2 = a few, 3 = about half, 4 = most, 5 = all). In all cases, responses of "not applicable" and "skip" were also permitted.

Scale items were coded so higher scale scores were reflective of the greater risk of HIV-infection associated with nondisclosure. Thus, the hypothesized effect of the intervention was to lower the mean scale score for disclosure behavior, disclosure intention, and disclosure attitude. Scale means were used rather than totals because every scale item was not applicable for every participant. Analysis of the internal consistency reliability of each scale was conducted utilizing Cronbach's alpha. Initial results for the analyses indicated a high reliability (.95 - .98) for each of the 3 disclosure risk scales. Item/total correlations for each item on each scale were also high. A principal components analysis using oblique rotation (direct oblimin) was used in light of the anticipated correlation between the scales. The three-factor solution accounted for 55% of the total variance. Examination of the pattern matrix confirmed that each of the scale items loaded solely on the hypothesized construct.

RESULTS

Analysis of data from the intervention pilot was guided by the study's research questions. Groups were assessed for initial differences on key demographic variables and outcomes. No differences emerged between the groups on age, race/ethnicity, relationship status, level of education, employment status, or monthly income. There were also no differences between treatment groups on baseline levels of sexual activity, behaviors and use of condoms in the context of each type of sexual behavior. Oneway analysis of variance was used to examine preintervention group differences on the disclosure measures. Initial differences on the intention scale were observed between the wait-list group and the facilitator-only group. Those in the facilitator-only group ($M = 2.20$, $SD = 1.07$) demonstrated lower scale scores (higher intention to disclose) than those in the wait-list group ($M = 2.80$, $SD = 1.11$). Baseline responses were then compared for each scale item to ascertain the source of the observed mean difference. Initial differences were observed between the treatment groups (facilitator only and computer and facilitator) and the wait-list group on two scale items from the disclosure intention scale: (a) "I plan to tell my partner with whom I engaged in any other sexual behavior," and (b) "I plan to tell my casual sexual partners." In both cases, the wait-list only group reported lower intention to disclose than those in either of the treatment groups. No group differences were observed in baseline levels on either the disclosure behavior or disclosure attitude scale.

To assess the impact of the intervention, postintervention scale scores were compared across treatment groups, with lower scores indicating intervention effectiveness. Lower scores were consistently observed in the facilitator-only group when compared with both the computer and facilitator and wait-list groups. Immediately postintervention, scores on the intention scale were significantly lower ($p < .05$) for those in the facilitator-only group ($M = 1.82$, $SD = 1.00$) than for the wait-list group ($M = 2.69$, $SD = 1.05$). At 3 months postintervention, the facilitator-only group scores ($M_{\text{behav}} = 2.11$, $SD = 1.26$, $p < 0.05$; $M_{\text{att}} = 1.78$, $SD = 0.81$, $p < .10$; $M_{\text{intent}} = 1.95$, $SD = 0.92$; $p < .05$) were significantly lower for each scale than the wait-list group scores ($M_{\text{behav}} = 2.83$, $SD = 1.37$; $M_{\text{att}} = 2.35$, $SD = 0.94$; $M_{\text{intent}} = 2.53$, $SD = 0.86$). Scores for the computer and facilitator group were not significantly different than wait-list scores at either postintervention observation. The facilitator-only group was also the only group to show significant score reductions between preintervention and 3 months post intervention on all three scales. To assess the practical significance of the score change from preintervention to 3-month post intervention risk scores, Cohen's d was computed as an estimate of effect size for each scale. Resulting effect sizes were medium to large for reduction in behavior scores (0.69), moderate for attitude scores (0.44) and small for intention scores (0.25).

Frequency of unprotected sex was also assessed by group and session to detect potential reductions in risky behavior as a result of the intervention. Again, the facilitator-only group experienced a reduction in the mean frequency for each of the risky sexual behaviors reported. Cohen's d for the behavioral changes observed ranged from .18 to .39. Reduction in the mean frequency of risky sexual behaviors was particularly noticeable among participants with multiple sexual partners. Small group sizes did not provide adequate power to conduct significance tests of these differences, but the results suggest that the intervention may be particularly effective in reducing risky sexual behavior for those reporting multiple sexual partners.

MULTILEVEL ANALYSIS

Traditional methods for the analysis of change, including repeated measures ANOVA and MANOVA, are subject to strong assumptions that affect their appropriateness for use. Specifically, these techniques assume that data are time structured. Time structured data are those that are collected at exactly the same time interval for all participants. Additionally, these techniques assume that all participants have the same number of observations. Alternatively, multilevel approaches permit the relaxation of these assumptions, and are more appropriate for use when these assumptions are violated (Holt, 2008). In intervention studies like this one, it is often impossible to ensure that observations are taken at equal time intervals across all participants. Therefore, a multilevel approach to the modeling of intervention effects was adopted.

Multilevel modeling can be seen as an extension of linear regression analysis. The multilevel approach regards the multiple observations resulting from repeated participant measurement as "nested" within individuals. Data for a multilevel analysis are arranged in the long form, with multiple records for each individual. At Level 1 of the multilevel model, the dependent variable, in this case disclosure scale score, is regressed on time as a predictor variable. Additional time-varying predictors may also be added at this level of the model. The effects of time and other Level 1 predictors are permitted to vary randomly across individuals, and this variability can be modeled at Level 2 of the model. Here, the effects of individual level predictors like group membership (facilitator only, computer and facilitator, control), ethnicity and education can be used as predictors of differences between individuals at baseline (intercepts) and in the trajectory of change across time (slopes). Multilevel models permit partitioning of variability into within-person and between-person components, and the analysis

of interactions between individual score at baseline and the rate of change as a result of treatment (Holt, 2008).

A hierarchical linear-growth-curve analysis using HLM 6.02 was employed to explore the effects of individual-level predictors including treatment group membership on both baseline scores and on the rate of individual score reduction. Separate analyses were run for each of the three disclosure subscales. For each analysis, a taxonomy was used to guide model building. The first model, called the unconditional means model (UCM) was generated to estimate the percentage of total variation in scores due to within-person changes over time based on the computed intraclass correlation coefficient (ICC). High values of the ICC are an indicator that participant scores are changing across time and suggest that additional analyses to explain this change are warranted. The second model, called the unconditional growth model (UGM), is then generated to begin modeling this within-person variability across time. The UGM includes the time variable as a predictor of within-person change at Level 1 of the model. The significance of time as a predictor of within-person change is determined, and the amount of variability in the rate of change between individuals is also assessed. Where the rate of change varies significantly between individuals, the uncontrolled effects of treatment model (UEM) is generated to model this variability. The UEM is generated by adding treatment group (facilitator only, computer and facilitator, control) as a predictor of the rate of change at Level 2. This model permits the assessment of the impact of intervention (facilitator-only or computer and facilitator) on the rate of change in scores. Treatment group was added as a set of two dummy-coded variables, with the wait-list control group as a reference. The final model, called the contextual model, was then generated to assess the effect of the best available predictors of variability in both initial scores (intercepts) and the rate of change (slopes) across time.

DISCLOSURE BEHAVIORS

Results of model fitting for disclosure behavior are provided in Table 1. A calculated ICC estimate of $0.838/(0.838+1.101)=0.432$ indicated that approximately 43% of the total variation in disclosure behavior scores was due to changes within the individual, suggesting that the individual scores were significantly affected by time. With the addition of the time variable as a Level 1 predictor of disclosure behavior score, the Level 1 residual decreased, indicating that time effects accounted for approximately 15% of the individual variation in disclosure behavior score. The likelihood ratio test result was significant, indicating that the inclusion of time as a predictor of disclosure behavior score represented an improved fit to the data. Intervention group, added as a predictor of the rate of change in disclosure behavior score at Level 2, explained 21.7% of the variance in the slope coefficient (the indicator of the rate of score reduction). Participants in the facilitator-only group experienced a greater rate of score reduction than those in the wait-list reference group ($\beta = -.316, p < .10$) whereas those in the computer-and-facilitator group experienced rates similar to the reference group ($\beta = 0.018, p = \text{n.s.}$). Despite the addition of treatment as a predictor of the rate of score reduction, significant unexplained variation in the rate of change remained. Therefore, additional individual-level predictors including ethnicity, education level, and employment were added as possible predictors of the rate of score change. None of these variables were found to be significant, therefore the final model included only treatment group as a predictor of the rate of score reduction. Analysis was then focused on participant baseline (preintervention) scores. Again, individual ethnicity, education level, and employment status were added as predictors of baseline score. Both minority participants ($\beta = 0.792, p < .05$) and those who were employed at the initiation of treatment ($\beta = 0.557, p < .05$) had significantly higher initial disclosure behavior scores than nonminority and unemployed participants at baseline. The proportion of variability in the intercept (baseline score) due to the addition of these predictor variables was 25.2%. However, significant unexplained variation in the initial status of participants remained.

The likelihood ratio test was significant, indicating that the fit of the model was improved with the addition of ethnicity and employment as predictors of initial disclosure behavior score.

DISCLOSURE ATTITUDES

Results of model fitting for disclosure attitude are provided in Table 1. The estimated ICC of $0.505/(0.505+0.441) = 0.534$ indicated that approximately 53% of the total variation in disclosure attitude scores was due to change over time. The addition of the time variable as a predictor at Level 1 resulted in a 24% reduction in the individual variability in disclosure attitude score. As was the case with disclosure behavior, treatment group was a significant predictor of the rate of score reduction. Participants in the facilitator-only group experienced a greater rate of reduction in disclosure attitude score ($\beta = -0.314, p < .05$) than those in the wait list control group. The addition of treatment group accounted for 19% of the variability in rate of change. The likelihood ratio test indicated a moderately significant improvement to model fit. Individual ethnicity, education level, and employment were added to the final model as predictors of the rate of score reduction (slope). Those participants who had completed some college ($\beta = 1.017, p < .001$) and those who had graduated from college ($\beta = 0.0822, p < .01$) had significantly lower reductions in scale scores. For participants with some college, this may be due in part to lower risk at baseline ($\beta = -1.327, p < .05$). However, college graduates not only improved at a slower rate, but started with higher risk scores ($\beta = 1.032, p < .05$) at baseline. In the final model, only level of education was a significant predictor of baseline score, and significant unexplained variability remained. Both treatment group and level of education were significant predictors of the rate of score reduction, and accounted for all of the observed variability.

DISCLOSURE INTENTIONS

The addition of the time variable resulted in no reduction in the within-person variability in disclosure intention. Variability in initial score was significant, but the variability in the rate of change was not. As a result of this analysis, the model-building procedure for disclosure intention was concluded.

RISKY SEXUAL BEHAVIOR ANALYSIS

To assess the effect of the treatment on the frequency of unsafe sex, odds ratios related to unprotected *insertive* anal intercourse (UIAI) and unprotected *receptive* anal intercourse (URAI) intervals were computed. In the first analysis (see Table 2), the odds of unprotected anal sex in any reported sexual encounter were used to compute between-group odds ratios. Odds ratios were computed based on treatment group, observation and partner knowledge of participant serostatus. In all cases, the wait-list control was used as the reference group. Results of analysis indicated that the odds of UIAI were significantly higher for the facilitator-only group (OR = 6.67) and the computer-and-facilitator group (OR = 5.91) than for the wait-list control prior to the intervention. These initial differences were due to very low levels of UIAI reported by the wait-list group. Postintervention, odds of UIAI in the facilitator-only group were only 2.94 time higher than for control, and by 3 months postintervention the odds of UIAI were similar for both groups. Odds of UIAI in the computer-and-facilitator group remained significantly higher than those for the wait-list control at all observations. Conversely, odds of URAI were not significantly different among the treatment and wait-list groups at preintervention. However, at postintervention, odds of URAI in the facilitator-only group were almost twice as high as those in the wait list control. At 3 month postintervention, odds were similar between the facilitator-only and wait-list control but were 3.28 times higher for the computer-and-facilitator group than for the wait-list control. When the computation of odds was limited to those encounters in which the partner was aware of participant HIV status, preintervention differences were again found between the facilitator-only group and the wait-

list control for both UIAI and URAI. At postintervention, the odds of UIAI remained twice as high for the facilitator-only group, but by 3-month postintervention, the odds of UIAI were similar for both groups. With respect to URAI, pretreatment differences in the odds were no longer apparent in either postintervention observation. The computer-and-facilitator group had higher odds of UIAI than control across all observations, but URAI-related differences were only observed at 3-months postintervention, where the odds of URAI were 3.33 times higher than for the wait-list group.

A second analysis involving the odds of unprotected sex in only encounters involving anal intercourse was conducted, with results shown in Table 3. Pretreatment differences between both treatment groups and the wait-list control remained for UIAI. The odds of UIAI in each treatment group were over four times higher than for the wait-list control before the intervention. At both postintervention observations, the odds of UIAI in the facilitator-only group were similar to wait-list control but remained higher in the computer-and-facilitator group. Restriction of this analysis to encounters in which disclosure had occurred did not alter the observed pattern of group differences. The odds of URAI were similar among all groups until 3 months postintervention, when the odds of URAI in the facilitator-only group were almost twice as high ($OR = 1.80$) as those for the wait-list control. However, when the analysis was restricted to those encounters in which disclosure had occurred, the odds of URAI were similar across all groups and observations.

DISCUSSION

The purpose of this study was to report results from the piloting of a newly developed disclosure intervention for disclosure to casual sexual partners. Results of the pilot study were encouraging, particularly for the facilitator-based treatment condition. Additionally, an author-derived instrument to measure serostatus disclosure behavior, attitude, and intention was piloted. Psychometric analysis of scores from this instrument indicated a high level of internal consistency in each of the three subscales, with alpha coefficients above .90 in all cases. Factor analysis also showed that each of the 39 items (13 for each scale) loaded as expected on the three constructs being assessed. Use of the 3 scales accounted for about 55% of the total variance in respondent score. Opportunities exist to further refine these measures to increase the percentage of variation explained.

Group comparisons at baseline, postintervention, and 3-month postintervention suggested that only participants in the facilitator-only group experienced decreases in scores on all three disclosure subscales. Effect sizes for these score reductions were large for the disclosure behavior scale, moderate for disclosure attitudes, and small for disclosure intentions. Similar effects of treatment were not observed in the computer-and-facilitator group. The facilitator-only group also reported decreased frequencies of unprotected sex (anal, oral, and vaginal) over time, and mean frequencies among wait-list and computer-and-facilitator groups increased. Further research is needed to ascertain what components of the intervention delivered maximum benefits.

Multilevel analysis was conducted on disclosure subscale scores to investigate the potential impact of the treatment on the rate of risk reduction and to ascertain the effect of individual-level variables including ethnicity, education level and employment on both baseline scores and on the rate of score reduction. The facilitator-only group experienced a greater rate of improvement in disclosure behaviors and attitudes than the wait-list control group whereas those in the computer-and-facilitator group did not. In the case of disclosure behavior, participants who identified themselves as members of a minority group, and those who indicated they were employed, had significantly higher baseline scores, but ethnicity and employment status were not related to the rate of risk reduction. With regard to disclosure

attitudes, the level of participant education was a significant predictor of both baseline score and the rate of risk reduction. The scores of participants with higher levels of education (some college, college graduates) did not improve at the same rate as those with only high school education. The effect of education on improvement is only partially explained by baseline differences. The model for disclosure intention did not display adequate variation in the between-individual rate of risk reduction to warrant examination of the effect of the treatment on this rate. In all three cases, significant variation in initial status remained, suggesting the possibility for further refinement of the models predicting baseline scores. Similarly, unexplained variability remained in the rate of behavior score improvement. However, treatment group and education accounted for all of the variability in the rate of attitude risk reduction.

Analysis of the odds of participation in UAI (insertive or receptive) suggests that the odds of unsafe anal sex were higher among members of both treatment groups than among those in the wait-list control, though these differences were largely absent for the facilitator-only group by 3-month postintervention. Odds ratios were particularly high at the baseline. Examination of the data indicated very low frequencies of unprotected sex reported among those in the wait-list control group. There are many potential reasons for these baseline differences, including sampling error and small sample size, so care must be taken in interpretation of the results. Odds of UAI were higher at 3 months postintervention in cases where the partner had knowledge of the participant's serostatus. This finding suggests that although the intervention may be effective in reducing the odds of engaging in risky sexual behavior overall, the act of disclosure may result in increased participation in risky sex. One possible explanation for this effect is participant serosorting; however, small sample sizes in this pilot precluded a definitive analysis of the role of disclosure within the context of seroconcordant relationships. Given that the risk of superinfection may be much greater than originally thought (Piantadosi, Chohan, Chohan, McClelland, & Overbaugh, 2007), the necessity to emphasize the risk of superinfection in behavioral interventions with HIV-positive MSM is underscored. Possible negative consequences associated with HIV disclosure should not impede progress in developing effective HIV disclosure interventions. Researchers are challenged with developing creative mechanisms to educate MSM regarding how other sexually transmitted diseases can impact an already compromised immune system. Further refinements of the intervention will need to address the necessity of safer sex in seroconcordant contexts to ensure that the occurrence of risky sexual behavior is not increased.

Results from the computer-assisted arm were disappointing but still informative. Overall, men in the computer-assisted portion of the project failed to significantly increase their disclosure behaviors. One plausible explanation is a preference to meet face to face with someone who can listen and be compassionate while verbally discussing their struggles. Additionally, the computer based portion of the study may have lacked critical components that could have enhanced its ability to engage participants and motivate behavior change. Because the literature is replete with evidence that MSM seek casual sex online, continued effort toward the development of an effective online intervention is recommended.

Results of this study suggest several possible alterations to the intervention that might strengthen potency. First, data showed an increasing trend for disclosure between pretesting and Session 4, but substantial changes also occurred between Session 4 and the 3-month follow-up. There are a number of plausible reasons for this finding. MSM may need time to rehearse new skills before implementing them. After a few months of utilizing the strategies, men's comfort with them may be strengthened enough to show increased usage. Second, men may withhold utilizing new skills until they have learned all strategies offered in the program. Regardless of the reason, two key changes in the intervention protocol are warranted. First, a booster session at 3 months should be added to the intervention to increase potency of the

intervention. The booster session could focus on encouraging progress and troubleshooting difficulties experienced with the strategies. The effectiveness of booster maintenance sessions have long been established as effective in the social sciences (Whisman, 1990). Second, in the pilot emphasis was placed on frequency of disclosure without accounting for the type of strategy preferred, number of different strategies utilized, or partner reactions. Each of these are important outcomes and should be assessed in future research.

LIMITATIONS

There are several limitations to the results of this study. First, the small sample size associated with the pilot study limited the statistical power of our analyses. Additionally, the procedures for recruitment resulted in a convenience sample of the target population, limiting generalizability. Finally, unexplained variability in the scale scores resulting from the pilot administration of the disclosure instrument indicates that factors other than participant behaviors, attitudes, and intentions need to be explored.

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TABLE 1
Individual-Level Predictors of Initial Status and Rate of Change (n = 77)

Fixed Effects	Disclosure Behavior		Disclosure Attitude	
	UEM	Full Model	UEM	Full Model
Predictors of initial status ^a				
Intercept	3.040 *** (0.149)	2.508 *** (0.197)	2.166 *** (0.149)	3.329 *** (0.387)
Education ^a				
Completed some college		n.s.		-1.327 ** (0.408)
Graduated from college		n.s.		1.032 ** (0.456)
High school only				
Ethnicity ^a				
Minority		0.792 *** (0.246)		n.s.
Non-minority				
Employment ^a				
Employed		0.557 *** (0.267)		n.s.
Not employed				
Predictors of rate of change				
Intercept	-0.094 (0.137)	-0.081 (0.137)	-0.090 (0.098)	-0.821 *** (0.206)
Group ^a				
Facilitator-only	-0.316 ~ (0.176)	-0.361 (0.177)	-0.314 * (0.119)	-0.262 * (0.111)
Computer-and-Facilitator	0.018 (0.176)	0.011 * (0.175)	-0.026 (0.119)	-0.031 (0.110)
Control				
Education ^a				
Completed some college		n.s.		1.017 *** (0.201)
Graduated from college		n.s.		0.822 ** (0.225)
High school only				

Note. Coefficients are unstandardized b coefficients.

^aReference groups in italics.

~
 $p < .10$

*
 $p < .05$

**
 $p < .01$

 $p < .001$.

TABLE 2
Odds Ratios of Unprotected Anal Intercourse by Group, Session, and Disclosure

Fixed Effect	Unprotected Insertive Anal Intercourse			Unprotected Receptive Anal Intercourse		
	Pre-	Post-	3 mos. Post	Pre-	Post-	3 mos. Post
Treatment group ^a						
Facilitator-only group	6.67*	2.94*	0.94	1.47	1.90*	1.52
Computer-and-facilitator group	5.33*	8.51*	5.49*	1.35	1.63	3.28*
Wait list group						
Where partner was aware of status ^d						
Facilitator-only group	6.48*	1.98*	0.93	2.29*	0.72	1.46
Computer-and-facilitator group	5.70*	25.40*	7.46*	1.33	1.38	3.33*
Wait list group						

^aReference groups in italics
* $p < .05$ (Confidence intervals computed using Woolf, 1955).

TABLE 3
Given Anal Intercourse Occurred, Odds Ratios of Unprotected Anal Intercourse by Group, Session, and Disclosure

Fixed Effect	Unprotected Insertive Anal Intercourse			Unprotected Receptive Anal Intercourse		
	Pre-	Post-	3 mos. Post	Pre-	Post-	3 mos. Post
Treatment group^a						
Facilitator-only group	4.19*	1.67	0.88	1.43	1.20	1.80*
Computer-and-facilitator group	4.64*	2.73*	2.54*	1.47	1.19	1.55
Wait list group						
Where partner was aware of status^d						
Facilitator-only group	3.86*	0.80	1.20	1.85	0.63	1.44
Computer-and-facilitator group	5.31*	2.56*	3.22*	1.50	1.00	1.05
Wait list group						

^aReference groups in italics.
* $p < .05$ (Confidence intervals computed using Woolf, 1955).