Telephone-Administered Motivational Interviewing Reduces Risky Sexual Behavior in
HIV-Positive Late Middle-Age and Older Adults: A Pilot Randomized Controlled Trial

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This dissertation titled
Telephone-Administered Motivational Interviewing Reduces Risky Sexual Behavior in
HIV-Positive Late Middle-Age and Older Adults: A Pilot Randomized Controlled Trial

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ABSTRACT

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Telephone-Administered Motivational Interviewing Reduces Risky Sexual Behavior in HIV-Positive Late Middle-Age and Older Adults: A Pilot Randomized Controlled Trial

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By 2014, 50% of all adults living with HIV will be at least 50 years old. This pilot randomized controlled trial compared two telephone-delivered motivational interviewing (MI) interventions to reduce risky sexual behavior in HIV-infected older adults compared to an externally valid control condition. Participants were 100 HIV-positive adults 45-plus years old who reported engaging in one or more occasions of unprotected anal and/or vaginal intercourse in the three months prior to study enrollment. Participants were randomly assigned to receive four sessions of telephone-delivered MI ($n = 38$), one session of telephone-delivered MI ($n = 39$), or no MI ($n = 23$) using weighted simple random assignment. Participants completed telephone-administered interviews to assess sexual behaviors at baseline, three months, and six months. Generalized estimating equations found that, relative to 4-session MI participants, controls reported approximately three times as many occasions of unprotected sex at 3- ($OR = 3.24$, 95% $CI = 1.79$ - 5.85) and 6-month ($OR = 2.70$, 95% $CI = 1.45$ - 5.00) follow-up, while 1-session MI participants reported four times as many unprotected sex acts as 4-session MI participants at 3- ($OR = 3.98$, 95% $CI = 2.38$ - 6.67) and 6-month ($OR = 4.39$, 95% $CI = 2.56$ - 7.46) follow-up. No differences in condom use were observed between 1-session MI and control participants. Brief telephone-delivered MI interventions may effectively

reduce risky sexual behavior in HIV-positive older adults. Additional large-scale studies that evaluate these interventions appear warranted.

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INTRODUCTION

The number of late middle-age and older adults living with HIV/AIDS in the U.S. continues to rise. In fact, it is estimated that by 2014, 50% of all persons living with HIV/AIDS (PLWH/A) will be 50 years of age or older (Justice, 2010) due largely to (1) better clinical care and the improved efficacy of highly active antiretroviral therapy (HAART) that has extended the lives of many PLWH/A and (2) increased incidence of HIV in older adults (CDC, 2003, 2010).

For more than a decade, secondary prevention efforts have sought to reduce HIV transmission risk behaviors in HIV-positive persons (Fisher & Smith, 2009). These interventions also help reduce the chances of HIV-positive persons acquiring other sexually transmitted infections or different strains of HIV, which can complicate medical treatment (Bernstein, Marcus, Nieri, Philip, & Klausner, 2010). Crepaz and colleagues (2006) conducted a meta-analysis of 10 randomized controlled trials and two quasi-experimental studies that tested the efficacy of sexual risk reduction interventions for HIV-positive persons. Overall, participants in risk reduction interventions showed reduced sexual risk behavior at follow-up compared to controls (OR = 0.57, 95% CI = 0.40-0.82). Secondary prevention trials conducted since the meta-analysis have found similar effects (e.g., Cosio et al., 2010; Lightfoot, Rotherum-Borus, Comulada, Reddy, & Duan, 2010; Velasquez et al., 2009) and have further demonstrated that brief interventions, even those comprised of only one or two sessions, can reduce sexual risk taking in HIV-positive persons (Cosio et al., 2010; Lightfoot et al., 2010).

Despite escalating HIV incidence and prevalence rates in older adults, and the fact that a non-trivial proportion of older persons living with HIV/AIDS continue to engage in risky sexual practices (Cooperman, Arnsten, & Klein, 2007; Lovejoy et al., 2008), most interventions have focused almost exclusively on younger adults and/or high-risk populations, such as men who have sex with men, intravenous drug users, and sex workers. Few secondary risk reduction interventions have been contextualized to meet the unique needs of sexually active HIV-infected older adults. These unique needs include biological and libidinal changes associated with aging (e.g., erectile dysfunction and the increased use of erectile dysfunction medications in older men), sexual partnerships with younger persons, survivor guilt over outliving romantic partners, and the impact of co-morbid chronic illnesses (e.g., diabetes, chronic pain, hypertension, osteoporosis, cancer, hepatitis C) and associated medications and/or treatments on perceptions of physical attractiveness.

Many HIV-positive older adults who would benefit from face-to-face sexual risk reduction interventions live with serious comorbid health conditions (e.g., osteoarthritis, chronic pain, visual impairments, HIV-associated neurocognitive disorders), have significant confidentiality concerns, and are geographically-isolated from traditional risk reduction resources (e.g., support groups; Crystal et al., 2003). As a result, face-to-face interventions are an unrealistic intervention modality for many members of this group. However, risk reduction interventions delivered using telephone technology are likely to reach a large number of geographically- and psychologically-distant older adults living

with HIV/AIDS, and brief telephone motivational counseling has reduced occasions of unprotected anal sex in men who have sex with men (Picciano et al., 2001).

In response to the lack of age-appropriate risk reduction interventions for sexually active HIV-positive older adults, and the potential of telephone technology to deliver cost-effective risk reduction interventions to this group, this study tested the efficacy of 1- and 4-session telephone-delivered sexual risk reduction interventions for HIV-positive middle-age and older adults who engage in risky sexual behaviors. It was hypothesized that participants receiving either intervention would report greater reductions in sexual risk behavior (specifically, unprotected anal and/or vaginal intercourse) and greater intentions to always practice safer sex compared to those in an externally valid control condition. Given the demonstrated efficacy of brief (i.e., as few as one session) motivational interventions to reduce risky sexual behavior in HIV-positive and at-risk individuals, it was further hypothesized that participants receiving a 1-session intervention would not differ on study outcomes, compared to participants receiving a 4-session intervention.

METHOD

Participants and Recruitment Procedures

Two recruitment strategies identified potential participants. First, recruitment brochures were sent to AIDS service organizations (ASOs) in five metropolitan areas—New York City, Philadelphia, Atlanta, Cincinnati, and Columbus, OH. Participating ASOs placed brochures in “high traffic” areas of the facility (e.g., waiting rooms and reception areas). Study brochures contained an e-mail address and toll-free telephone number that interested persons used to inquire into the study. Second, the research team had compiled a “call list” of HIV-positive older adults who had been recruited through ASOs in the same five cities but did not meet full inclusion criteria for previous studies conducted by the research team in the past three years. These individuals requested to be contacted if future studies were initiated for which they might be eligible. Recruitment letters were mailed to these 94 individuals inviting them to contact the study team to learn more about the planned study.

Following initial contact, a member of the study team mailed potential participants two informed consent documents and asked them to return one signed copy if interested in participating in the study (the second copy was for their personal records). A total of 307 documents were mailed to potential participants. Upon receipt of the signed consent form, a member of the research team called the individual to conduct an eligibility screening. Of the 307 potential participants, 27 never returned a signed consent form, nine individuals were never screened after multiple failed attempts to contact them, and 271 persons completed the screening survey. Eligible participants satisfied the

following inclusion criteria: (1) self-reported being HIV-seropositive or having progressed to AIDS; (2) 45-plus years of age; (3) English-speaking; (4) access to a landline or cellular telephone; and (5) reporting engagement in one or more occasions of unprotected anal or vaginal intercourse in the past three months.

One-hundred (N = 100) participants were enrolled into the study between December 2009 and March 2010. A priori power analyses, based on outcome effect sizes reported by Cosio et al. (2010) and Fisher et al. (2006), suggested that 100 participants would permit the detection of significant between-group differences on the primary outcome measure of *number of unprotected anal and vaginal sexual acts* at the $\alpha = .05$ level with 80% power. Figure 1 presents the CONSORT flowchart.

Design and Randomization Procedures

One-hundred eligible participants completed a telephone-administered baseline interview conducted within two weeks of the participant's eligibility determination (Mean = 3.5 days, Median = 3.0 days, Minimum = 0 days, Maximum = 14 days). Immediately following the baseline interview, participants were assigned to one of three parallel study conditions using concealment of allocation procedures. Prior to initiating the study, off-site personnel utilized a random numbers table and weighted simple random assignment to generate the allocation sequence, yielding a 2 (1-session motivational interviewing [MI]): 2 (4-session MI): 1 (SOC Control) ratio. The 2:2:1 randomization procedure was employed to (1) ensure that approximately 80% of study participants would receive one of two interventions that were hypothesized to reduce sexual risk and protect their own health and the health of their sexual partner(s) and (2)

include a control group against which the two interventions could be compared. This protocol was reviewed and approved by the University's Institutional Review Board. No adverse events were reported during the clinical trial.

Sealed, consecutively numbered, opaque envelopes prepared by off-site personnel contained the randomly allocated conditions. At the conclusion of the baseline interview, the interviewer opened the next envelope in the sequence, revealing the condition to which the participant had been assigned. All research personnel were blind to participant condition prior to, and during, the baseline interview. If the participant was assigned to either of the two MI conditions, the interviewer scheduled the initial intervention session for a time within the next 14 days that was most convenient for the participant. The mean elapsed time from the baseline interview to the initial session was 10.0 days (Median = 6.0 days, Minimum = 0 days, Maximum = 58 days). Seventy-three percent and 85% of participants completed the initial MI session within seven and 14 days of the baseline interview, respectively.

Study Conditions

The primary goal of the current study was to assess the efficacy of brief interventions to reduce risky sexual behaviors in HIV-positive middle-age and older adults. Particular attention was devoted to reducing rates of unprotected anal and/or vaginal intercourse, two behaviors that increase one's risk of transmitting HIV to sexual partners and/or leaving the HIV-seropositive individual vulnerable to the acquisition of other sexually transmitted infections. The Transtheoretical Model (Prochaska, DiClemente, & Norcross, 1992) provided the primary theoretical framework for these

brief interventions. At baseline, all enrolled participants were in a “pre-action” stage of readiness to always use protection during anal and/or vaginal intercourse.

The current interventions were adapted from two treatment manuals: (1) *Project MATCH*, a 4-session Motivational Enhancement Therapy for problem drinking (Miller, Zweben, DiClemente, & Rychtarik, 1992) and (2) *Project Positive Power*, a brief telephone-delivered MI sexual risk reduction intervention for HIV-positive rural adults (Cosio et al., 2010). The study’s 1- and 4-session MI interventions were designed to be identical, other than treatment dose. However, the practicality of administering a 1- versus 4-session intervention necessarily led to unique treatment characteristics. The similarities between the treatments are delineated below, followed by a discussion of characteristics unique to each treatment.

Similarities across interventions

Therapists utilized MI, a client-focused and directive form of counseling, to explore participants’ sexual relationship dynamics and further their readiness to always engage in protected sex. MI has been described as a guiding style that helps individuals discover their motivation for changing a deleterious behavior, while exploring and resolving their ambivalence about changing the behavior (Miller & Rollnick, 2009; Miller & Rollnick, 2002). Therapists used open-ended questions and empathic reflections to initiate and direct discussions. Although therapists received, prior to working with a participant, a “summary” sheet of demographic information and sexual behaviors based on the participant’s baseline interview, at no time during the session did they provide feedback to clients based on this assessment (unlike related motivational treatments such

as *Project MATCH*). Therapists were instructed to “discover the client’s story as if you knew nothing about her or him.” The topic of sexuality often naturally arose during early discussions. However, in the event that the client did not initiate discussions of sexuality, therapists made the following type of statement: “When two people become intimate, discussions of whether or not to use protection sometimes take place. Tell me about any discussions you and your partner may have had.” Therapists ascertained their client’s current sexual practices and employed importance and readiness rulers (Rollnick, Miller, & Butler, 2008), respectively, to assess the extent to which clients felt that the use of condoms during all occasions of anal and/or vaginal sex was both important and a practice they felt ready to initiate.

During the course of these discussions, therapists appropriately recognized that benefits exist to engaging in unprotected sex with one’s sexual partner(s) and helped clients identify and process ambivalence about changing current sexual practices, in light of their relationship, health, and general life goals. For clients in the pre-contemplation and contemplation stages of change, as evidenced by clients’ reported readiness to engage in protected sex during readiness ruler activities, therapists attempted to develop discrepancy between client goals and current sexual behaviors.

If, over the course of the session(s), clients reported they were ready to always use protection during anal and/or vaginal intercourse, therapists assessed the clients’ confidence to carry out these intentions, and, in the event a client lacked confidence to use protection consistently, barriers to condom use were explored (e.g., lack of sexual assertiveness, negotiating condom use with sexual partners who did not want to use

protection, sexual disinhibition when under the influence of substances, an inability to maintain sexual arousal when using protection, and “getting caught up in the moment”). The therapist and client collaboratively identified strategies to overcome barriers to condom use and specific change plans to employ these strategies. Therapists then strengthened the client’s commitment to change by affirming client change talk, while emphasizing client self-efficacy and behavioral control to use condoms consistently. Therapists concluded treatment by summarizing the client’s relationship dynamics, current sexual practices, readiness to engage in protected anal and/or vaginal intercourse, health and life goals as they relate to sexuality, specific change plans to overcome barriers to using protection, if applicable, and client confidence in carrying out these change plans.

1-session MI

This intervention was designed to be 45-50 minutes in duration. The actual length averaged 48.39 minutes (SD = 13.04 minutes, Minimum = 20.18 minutes, Maximum = 69.05 minutes). Due to the brief nature of this intervention, therapists focused on the most high-risk behavior for clients who had multiple risky behaviors and/or sexual partnerships and only discussed secondary behaviors and partnerships if time permitted. Because the intervention consisted of a single session, therapists were unable to assess any between-session changes in clients’ readiness to engage in protected sex, follow up on clients’ progress toward implementing change plans, or assist in the modification of change plans as needed.

4-session MI

Combining the four sessions, this intervention averaged 163.13 minutes in duration (SD = 39.58 minutes, Minimum = 107.72 minutes, Maximum = 255.12 minutes). The average length for Sessions 1 through 4 was 44.37 minutes, 37.92 minutes, 38.75 minutes, and 38.25 minutes, respectively. Intervention sessions were conducted one week apart. Session 1 focused on ascertaining the client's current relationship and sexual dynamics. Past relationships as they related to current sexual practices were discussed, as appropriate. Therapists also assessed the client's current readiness to always engage in protected sex. In Session 2, therapists discussed the client's concurrent sexual relationships, if applicable, and the sexual behaviors associated with these relationships. Therapists also identified the client's health, relationship, and general life goals and helped the client process ambivalence about always engaging in protected sex in light of these goals. If not addressed in an earlier session, Session 3 focused on the identification of barriers to engaging in protected sex and the development of a client-generated sexual behavior change plan. Finally, in Session 4, the client and therapist discussed the client's progress toward implementing the change plan and made plan modifications as needed.

Standard of care control

Participants assigned to the Standard of Care (SOC) Control condition did not receive any active intervention. However, similar to participants in both MI conditions, they were encouraged to obtain information and support for their romantic relationships and sexuality through local ASOs, HIV-related and other support groups, informational websites, and any other resources available to them. The purpose of the SOC Control

condition was to represent participants' use of psychosocial services available to them in their community settings.

Therapist Training

MI therapists were 10 master's-level clinical psychology doctoral trainees with prior didactic training in MI and other client-centered therapies. In preparation for the study, therapists participated in a 10-hour MI workshop that included an interactive didactic component, role playing situations relevant to the intervention, and group discussions of role-play activities. Therapists also participated in a five-hour training program on HIV (including pathogenesis, clinical course, epidemiology, treatment, psychosocial issues, sexuality, and aging with HIV) and an additional five-hour training session on the project's MI intervention manual. Because the 1- and 4-session MI interventions were designed to be similar in nature, all therapists conducted both types of interventions.

Intervention Fidelity

To improve intervention fidelity, therapists participated in weekly group supervision over the course of the study with licensed clinical psychologists. Intervention sessions were audio-recorded, reviewed by the clinical supervisor(s), and discussed during the weekly group supervision. In addition, all sessions were transcribed and coded using the Motivational Interviewing Treatment Integrity Code, version 3.1.1 (MITI; Moyers, Martin, Manuel, Miller, & Ernst, 2010). The MITI assesses therapist utterances to evaluate intervention fidelity in clinical trials that test MI interventions.

In line with MITI guidelines, random 20-minute audio segments were selected from each intervention session. Two trained coders coded therapist utterances from which summary scores were derived in the following domains: Global Spirit, Reflection to Question Ratio, Percent Open Questions, Percent Complex Reflections, and Percent MI-Adherent. The MITI provides proficiency cut-offs for summary scores that indicate beginning proficiency and more advanced competency in MI. On average, therapists met competency across Global Spirit, Reflection to Question Ratio, and Percent Complex Reflections, while meeting beginning proficiency (and near competency) for Percent Open Questions and Percent MI-Adherent. While variability existed across therapists, all therapists met at least beginning proficiency (and often competency) in four of the five summary domains, and seven of the 10 therapists met at least beginning proficiency in all five domains, suggesting that interventions conducted in the current study remained adherent to MI principles.

Assessment Instrument

Telephone-administered interviews were used to collect participant data at baseline and 3- and 6-month follow-up. Domains assessed included demographics, detailed sexual behavior, alcohol and drug use, and additional psychosocial measures germane to the current study. Study interviewers were six undergraduate students at the participating university. Interviewers underwent 20 hours of training that included didactic presentations about HIV and the study questionnaire, as well as the coding and review of five audio-recorded interviews. In addition, interviewers “watched” (i.e., listened over speakerphone, with the participants’ permission) five live interviews and

were then observed by the interviewer trainer (again with participants' permission) conducting five interviews. To minimize coder drift, weekly meetings were held between interviewers and the interviewer trainer to discuss all interviews conducted in the previous week and to reach agreement on any ambiguous codings.

Interviews were identical across baseline and 3- and 6-month follow-up and took approximately 60 minutes to complete. Interviewers were blinded to participant condition prior to conducting all interviews. Participants received \$20 for completing the baseline interview, \$25 for the 3-month follow-up, and \$30 for the 6-month follow-up. To maximize the reliability of participant responses, particularly those of primary sexual behavior outcomes, all assessed behaviors utilized a retrospective recall period of the past three months (Jaccard et al., 2002; Napper, Fisher, Reynolds, & Johnson, 2010).

Primary study outcome

Participants responded to a series of questions, adapted from Misovich, Fisher, and Fisher (1998) and Ostrow (1989), about their sexual behavior over the past three months. The number of unprotected anal and vaginal sex acts in the past three months was the study's primary behavioral outcome.

Secondary study outcome

Participants provided their readiness to engage in sexually safe behaviors (i.e., their "stage of change") by endorsing one of the following five statements, which was further corroborated by their sexual behavior reports: (1) I do not intend to always use protection during anal and/or vaginal intercourse in the next six months, (2) I intend to always use protection during anal and/or vaginal intercourse starting in the next six

months, but not in the next 30 days, (3) I intend to always use protection during anal and/or vaginal intercourse starting in the next 30 days, (4) I began always using protection during anal and/or vaginal intercourse within the last six months, (5) I began always using protection during anal and/or vaginal intercourse more than six months ago. These statements correspond, respectively, to the pre-contemplation, contemplation, preparation, action, and maintenance stages of change, as defined by Prochaska and colleagues (1992). For analytic purposes, participants were placed in one of two categories: pre-action (i.e., pre-contemplation, contemplation, or preparation) vs. action/maintenance.

Statistical Analyses

Generalized estimating equations (GEE), with model-based variance estimation and unstructured correlation matrices, assessed longitudinal outcomes for all dependent measures. Model diagnostics indicated the presence of overdispersion for the dependent variable “number of unprotected anal and vaginal sex acts in the past three months.” As such, a negative binomial distribution with a log link function was used to model these data. The dichotomous outcome variable utilized a binomial distribution with a logit link. GEE models estimated the effects of (1) time (not reported), (2) study condition (not reported), and (3) the time by study condition interaction. An $\alpha \leq .05$ was used for all analyses.

RESULTS

The average participant was 53.82 years of age (SD = 4.93 years, Min = 45.03 years, Max = 66.25 years) and had been living with HIV for nearly 17 years. Sixty-seven percent of participants had progressed to AIDS, although only 16% currently reported plasma CD4 cell counts less than 200 cells/ μ l, and 80% reported undetectable viral loads. Most participants (87%) self-identified as an ethnic minority (primarily African-American), over one-half (54%) were male, and 52% were heterosexual, with remaining participants self-identifying as gay or bisexual. Eighty-five percent of participants had annual household incomes less than \$20,000. Participants across the three study conditions did not differ on any baseline demographic or clinical variable. See Table 1 for baseline sample characteristics by study condition.

Participant Attrition

Ninety-two and 95 of the 100 participants completed the 3- and 6-month follow-up assessments, respectively (see Figure 1). Participants who did not complete the 3- and 6-month follow-up assessments had lower nadir plasma CD4 counts than participants who did complete the follow-up assessments, $t(90) = 2.33, p < .05$ and $t(93) = 2.29, p < .05$, respectively. Completers and non-completers did not differ by experimental condition or any other baseline demographic or clinical variables. For missing data, a last-observation-carried-forward (i.e., intention-to-treat) data imputation strategy was employed in order to provide a conservative estimate of treatment effects (Streiner & Geddes, 2001).

Primary Outcome Analyses

A significant “Time x Condition” interaction (Wald $\chi^2(4) = 61.15, p < .001$) indicated that participants in the 4-session MI condition engaged in the fewest occasions of unprotected sex at the 3- and 6-month follow-ups. Compared to 4-session MI participants, SOC controls had approximately three times as many occasions of unprotected sex at 3-month (OR = 3.24, 95% CI = 1.79-5.85) and 6-month (OR = 2.70, 95% CI = 1.45-5.00) follow-up, while 1-session MI participants had four times as many unprotected sex acts as 4-session MI participants at 3-month (OR = 3.98, 95% CI = 2.38-6.67) and 6-month (OR = 4.39, 95% CI = 2.56-7.46) follow-up. SOC controls did not differ from 1-session MI participants at the 3-month (OR = 0.81, 95% CI = 0.47-1.41) or 6-month (OR = 0.61, 95% CI = 0.35-1.09) assessments. See Figure 2.

Secondary Outcome Analyses

All participants were in a pre-action stage of readiness to use protection at baseline (n = 32 in pre-contemplation, n = 22 in contemplation, and n = 46 in preparation). At 3-month and 6-month follow-up assessments, a respective 45% and 57% of participants had reached the action stage of change, in which they had always used protection during anal and/or vaginal intercourse for at least the past month and intended to continue using protection in the future. The “Time x Condition” interaction was not significant, Wald $\chi^2(1) = 1.48, p = .48$. Exploratory analyses indicated that, at 3-month follow-up, 4-session MI participants were more than three times as likely to be in an action stage of readiness to use protection compared to SOC controls (OR = 3.15, 95% CI = 1.02-9.72); however, this relationship was no longer significant at the 6-month

assessment (OR = 2.23, 95% CI = 0.78-6.40). No differences were observed between participants in the 4- and 1-session MI conditions at 3-month (OR = 1.17, 95% CI = 0.48-2.86) or 6-month (OR = 1.19, 95% CI = 0.48-2.99) follow-up. See Figure 3.

Harm Reduction

We used GEEs with negative binomial distribution specifications to assess the extent to which the $n = 57$ participants who reported always engaging in protected anal and/or vaginal intercourse (i.e., those in the action stage of change) at the final study assessment may have adopted a harm reduction approach by reducing overall sexual activity and/or substituting unprotected oral sex for unprotected anal and vaginal intercourse. Specifically, we examined changes from baseline to 6-month follow-up in total number of (1) anal/vaginal and (2) oral sex acts. In addition, changes in number unprotected oral sex acts were assessed.

Participants in the 1-session MI ($n = 23$) and SOC Control ($n = 10$) conditions who reported being in an action stage to use condoms for anal and vaginal intercourse at 6-month follow-up reported overall reductions in total anal/vaginal sex acts (OR = 0.07, 95% CI = 0.04-0.13 for 1-session MI participants; OR = 0.41, 95% CI = 0.17-1.01 for SOC controls) and oral sex acts (OR = 0.21, 95% CI = 0.11-0.39 for 1-session MI participants; OR = 0.41, 95% CI = 0.17-0.96 for SOC controls) from baseline to 6-month follow-up, whereas those in the 4-session MI condition ($n = 24$) reported no change in total sexual activity (OR = 0.70, 95% CI = 0.41-1.19 for total anal/vaginal sex acts; OR = 1.06, 95% CI = 0.61-1.84 for total oral sex acts). Participants in all conditions who reported readiness to use protection for anal and vaginal sex at the 6-month follow-up

reported fewer occasions of *unprotected* oral sex from baseline to 6-month follow-up (OR = 0.51, 95% CI = 0.28-0.93 for 1-session MI participants; OR = 0.23, 95% CI = 0.13-0.42 for 4-session MI participants; OR = 0.18, 95% CI = 0.08-0.38 for SOC controls).

Demand Characteristics

Given that approximately 40% of participants in the SOC Control condition (i.e., those who received no active intervention) reported being in the action stage of readiness to always use condoms for anal and vaginal intercourse at the final assessment, additional analyses were conducted to assess the likelihood that these reported sexually safe behaviors were due to interviewer demand characteristics. GEEs with negative binomial distributions assessed the change in reported alcohol, marijuana, and crack/cocaine use from baseline to 6-month follow-up in SOC Control participants who reported being in an action stage of readiness to use protection at 6-month follow-up. Because substance use in the context of risky sexual behavior carries with it a negative social stigma, one would expect reports of substance use among these SOC controls to also decrease, along with their reports of risky sexual behavior. However, analyses revealed an increase from baseline to 6-month follow-up in reported days of alcohol (OR = 1.46, 95% CI = 1.40, 1.52), marijuana (OR = 1.04, 95% CI = 1.03-1.04), and crack/cocaine (OR = 2.80, 95% CI = 1.72-4.56) use in the past three months, suggesting that interviewer demand characteristics and the need to provide socially desirable responses did not influence SOC controls' reports of risky behaviors.

DISCUSSION

This study found that brief telephone-delivered motivational interviewing reduces sexual risk behavior in HIV-positive late middle-age and older adults compared to an externally valid standard of care control condition. This finding is consistent with research that has demonstrated the efficacy of brief telephone-delivered interventions in reducing sexual risk behavior in HIV-positive rural adults and at-risk groups such as men who have sex with men (Cosio et al., 2010; Picciano et al., 2001).

Somewhat unexpectedly, participants who received four sessions of MI reduced the frequency with which they engaged in unprotected anal and/or vaginal sex to a greater extent than those who received a single MI session. Although some studies have found that very brief motivational interventions in the context of standard patient care can reduce risky sexual behavior in HIV-positive persons (Fisher et al., 2006), these interventions often occur within the context of an already established helping relationship (e.g., a doctor-patient relationship). In the current study, 1-session MI therapists were charged with establishing a working therapeutic alliance with participants and providing counseling around sexual risk behavior in a single 50-minute session over the phone. It is possible that this short amount of time lacked sufficient intensity to produce meaningful behavior change. In addition, participants who received four sessions of MI had greater opportunity to process ambivalence about using condoms, discuss the dynamics of concurrent sexual partnerships when applicable, develop plans to use condoms with sexual partners, and to evaluate and adjust plans as necessary. Four-session MI therapists also had greater opportunity to elicit and validate clients' own reasons for using

protection. Our findings align with those in the literature on problem drinking that support the efficacy of four MI sessions to change risky behavior (Project MATCH Research Group, 1998).

It is notable that participants in *both* MI conditions showed trends toward greater readiness to always use protection at 3- and 6-month follow-ups, compared to SOC controls. Nonetheless, this trend did not reach statistical significance, perhaps due to limited power as a result of the modest sample size. However, the absolute difference between intervention and control participants in proportion of individuals who reached the action stage of change has clear clinical significance, with approximately 60% of participants who received an intervention reporting consistent condom use, compared to approximately 40% of participants who did not engage in MI.

The observed reductions in unprotected anal and vaginal intercourse among participants in the current sample did not lead to increases in other “substitute” sexual acts such as protected anal/vaginal or unprotected oral sex. In fact, participants in all study conditions who reported no unprotected anal and vaginal intercourse at the study conclusion also reported a reduction in occasions of unprotected oral sex. Sexually safe participants in the 1-session MI and SOC Control conditions appeared to reduce total sexual activity, whereas participants in the 4-session MI condition maintained baseline levels of sexual activity. The nature of the 4-session intervention, which allowed for MI interventionists and participants to discuss ways to achieve sexual satisfaction and fulfillment while maintaining sexual safety, may account for these between condition findings. Future qualitative studies should explore this phenomenon.

Regardless of study condition, participants reduced sexual risk behavior over the course of the study. This is particularly notable for control participants, given that approximately two-fifths of these individuals reported consistent condom use at the study's conclusion. One possible explanation is self-monitoring or reactivity (Godin et al., 2010; Veasquez et al., 2009), in which the mere act of responding to multiple questions about sexual behavior over multiple assessment periods influenced future behaviors. A second explanation concerns demand characteristics. The possibility of *interviewer* demand characteristics was attenuated with analyses that showed increased reporting of the socially undesirable behavior of substance use among SOC controls, many of whom reported reduced sexual risk behavior at the study's final assessment. However, *therapist* demand characteristics may have contributed to participant reports of sexual behavior because persons receiving four sessions of MI may have felt more compelled to report reductions in risk behavior than those receiving one or no MI sessions. In addition, behavioral interventions are often unable to blind participants and interventionists to treatment condition, and participants in the current study were made aware of all conditions to which they may be randomly assigned during the informed consent process. Future studies should employ a time-matched attention control condition and refrain from describing the specific study conditions during informed consent to control for these potential biases.

Study findings should be considered in light of several additional limitations beyond those addressed previously. The study sample was comprised primarily of ethnic minority persons living in urban areas of the Eastern and Midwestern United States who

were long-term survivors of HIV and connected to ASOs in their communities. Although the sample does not accurately represent the population of HIV-positive older adults in the United States (i.e., the current sample has a lower proportion of men who have sex with men, a greater proportion of ethnic minority persons, and no persons who live in rural areas), it does over-represent a demographic that has been at considerable risk of new HIV infections in recent years, namely, ethnic minority women (CDC, 2010).

In addition, self-reported sexual behavior using 3-month retrospective recall periods has been shown to be reliable (Jaccard et al., 2002; Napper et al., 2010); however, the validity of these self-reports remains in question. Future risk reduction intervention trials should employ objective biomarkers (e.g., prostate specific antigen; Minnis et al., 2009) of sexual activity to corroborate participant self-reports. Other non-biological assessment methods that may enhance validity of sexual behaviors include daily sexual behavior diaries or the corroboration of reported sexual behavior with the reports of participants' sexual partners.

In spite of these limitations, the current study showed that brief telephone-administered motivational interviewing to reduce risky sexual behavior in HIV-positive middle-age and older adults is feasible and may reduce the frequency of unprotected anal and/or vaginal intercourse in this population. The public health implications of these findings are significant, given the high transmissibility of HIV via unprotected anal and vaginal intercourse and the heightened morbidity associated with HIV infection and co-morbid age-related chronic health conditions. MI continues to grow in popularity as a treatment modality to catalyze health behavior change, and trainings on the acquisition of

MI skills are becoming more readily available, making it a well-known, if not oft-practiced, approach to behavior change within the healthcare arena. Although the current study tested MI to reduce sexual risk behavior as a stand-alone treatment, it could be integrated into brief teletherapy for the treatment of psychiatric conditions (e.g., depression, anxiety), substance use disorders, or primary HIV medical care. As the proportion of older adults who are infected with HIV/AIDS continues to rise, cost-effective secondary risk reduction interventions such as MI that are tailored to the unique needs of this older cohort will be paramount for reducing the spread of HIV and protecting the health of those already infected with the virus.

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TABLES

Table 1

Sample Characteristics at Baseline by Experimental Condition (N = 100)

Variable	1-Session MI (n = 39)	4-Session MI (n = 37)	SOC Control (n = 23)
	% (n)	% (n)	% (n)
Age ^a	53.99 ± 4.76	53.58 ± 5.68	53.95 ± 3.96
Gender			
Male	51.3 (20)	52.6 (20)	60.9 (14)
Female	48.7 (19)	44.7 (17)	34.8 (8)
Transgender	0.0 (0)	2.6 (1)	4.3 (1)
Sexual Orientation			
Gay	25.6 (10)	36.8 (14)	34.8 (8)
Heterosexual	59.0 (23)	47.4 (18)	47.8 (11)
Bisexual	15.4 (6)	15.8 (6)	17.4 (4)
Race			
Caucasian	10.3 (4)	15.8 (6)	13.0 (3)
African-American	61.5 (24)	65.8 (25)	69.6 (16)
Latino/Latina	12.8 (5)	10.5 (4)	4.3 (1)
Other/Multi-racial	15.4 (6)	7.9 (3)	13.0 (3)

Table 1 (continued)

Annual Household Income ^b

< \$10,000	65.8 (25)	50.0 (19)	47.8 (11)
\$10,001 – \$20,000	23.7 (9)	34.2 (13)	34.8 (8)
\$20,001 – \$30,000	2.6 (1)	13.2 (5)	4.3 (1)
\$30,001 – \$40,000	7.9 (3)	2.6 (1)	4.3 (1)
> \$40,000	0.0 (0)	0.0 (0)	8.7 (2)

Years Positive ^a	15.72 ± 7.20	17.03 ± 5.72	17.52 ± 6.80
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AIDS Criteria Ever Met ^c

Yes	57.9 (22)	68.4 (26)	65.2 (15)
No	42.1 (16)	31.6 (12)	34.8 (8)

AIDS Criteria Currently Met ^c

Yes	5.3 (2)	23.7 (9)	21.7 (5)
No	94.7 (36)	76.3 (29)	78.3 (18)

Nadir CD4 ^{a, d}	218.03 ± 219.67	173.05 ± 169.62	166.35 ± 151.95
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Current Viral Load ^e

Detectable	16.2 (6)	21.1 (8)	26.1 (6)
Undetectable	83.8 (31)	78.9 (30)	73.9 (17)

^a Denotes mean ± standard deviation.

^b One participant in the 1-session MI condition responded “don’t know” to income.

^c One participant in the 1-session MI condition did not know whether she had ever been diagnosed with AIDS or whether she currently met AIDS-defining criteria.

^d Four participants in the 1-session MI condition and one participant in the 4-session MI condition did not know the value of their lowest CD4 count.

^e Two participants in the 1-session MI condition did not know the results of their most recent viral load test.

FIGURES

Figure 1. The CONSORT flowchart of study participants. MI = Motivational Interviewing; SOC = Standard of Care; LOCF = Last Observation Carried Forward

Figure 2. Mean number of unprotected anal and vaginal sex acts by time and study condition.

Figure 3. Proportion of participants who were in an action stage for always using protection during anal and/or vaginal intercourse by time and study condition. Note: 0% of participants across conditions were in an action stage of readiness to use protection at baseline.

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