Does Motivational Interviewing Counseling Time Influence HIV-Positive Persons' Self-Efficacy to Practice Safer Sex?

Zulfiya Chariyeva[1], **Carol E. Golin**[1], **Jo Anne Earp**[1], and **Chirayath Suchindran**[2]

[1]Department of Health Behavior and Health Education, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Campus Box 7440, Chapel Hill 27599-7440, USA

[2]Department of Biostatistics, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, USA

Abstract

Objective—This study examined the impact of motivational interviewing (MI) counseling time on self-efficacy to practice safer sex for people living with HIV/AIDS (PLWHA).

Methods—In 4 month intervals we followed a cohort of 490 PLWHA for 12 months. We conducted hierarchical linear regression models to examine changes in safer sex self-efficacy when participants received zero, low to moderate (5–131 minutes) and high (132–320 minutes) doses of MI time. We conducted a similar analysis using number of counseling sessions as the predictor variable.

Results—Participants with low to moderate doses of MI counseling had 0.26 higher self-efficacy scores than participants with zero MI time (p=0.01). Also, they had 0.26 lower self-efficacy scores than participants with high amounts of MI time (p=0.04). Participants with high doses of MI had a 0.5 higher self-efficacy score than participants with zero amount of MI time (p<0.0001). Participants who received 3–4 counseling sessions had 0.41 greater self-efficacy scores than participants who did not receive any sessions (p<0.0001) but did not differ from participants receiving 1–2 sessions.

Conclusion—MI time is a key to enhancing safer sex self-efficacy among PLWHA.

Practice Implications—Safer sex self-efficacy improves the more MI counseling time and sessions PLWHA receive.

Keywords

HIV; Motivational Interviewing; Self-efficacy; Safer Sex

1. Introduction

Between a third (30%) and a half (46%) of sexually transmitted HIV infections in the US are passed on by people who know that they are HIV positive (1). Up to one third of HIV-infected people still practice unprotected sex after learning about their seropositive status (2,

Corresponding Author: Carol E. Golin, MD, UNC Sheps Center for Health Services Research, 725 MLK Jr. Blvd., Campus Box 7590, Chapel Hill, NC, 27599-7590 Phone: (919) 966-7939; Fax: (919) 966-3811; Carol_Golin@med.unc.edu.

3). In addition to transmitting the virus to HIV negative partners, unsafe sex can result in co-infection of people living with HIV/AIDS (PLWHA) with other sexually transmitted infections (STI), as well as the development of super-infection with other HIV strains (4–6). Many PLWHA, however, face several challenges to practicing safer sex. Understanding how best to assist PLWHA practice safer sex is critical to reducing HIV spread and optimizing the health of PLWHA. A meta-analysis of 12 randomized controlled trials of interventions promoting safer sex behavior for PLWHA has demonstrated that behavioral interventions are effective in reducing unprotected sex among them and decreasing STI acquisition (7). That same review also noted certain features that were associated with successful interventions (e.g. being theory-based, including skills-building, lasting more than three months total), but to enhance such programs more information is needed.

Motivational interviewing (MI), a counseling style that intends to change behavior by helping clients "explore and resolve ambivalence" (8), is one intervention approach used to reduce risky behaviors of PLWHA (9–13). Counselors guide clients toward health changes by expressing empathy, helping them "perceive a discrepancy between where they are and where they want to be" (14), avoiding argumentation, rolling with resistance, and supporting self-efficacy (15). A systematic review of 72 randomized controlled trials concluded that motivational interviewing in a scientific setting "outperforms traditional advice giving in approximately 80% of studies" (16). Often, however, studies documenting the success of MI conclude that the "optimal" MI dose to produce various behavioral changes is unknown. Rollnick and Miller have questioned how brief MI counseling can be and still retain the essence of the MI method (17). Existing evidence suggests that achieving an effect with MI may be directly related to the duration of the MI counseling as well as to the number of encounters clients have with counselors (16, 18). There is some evidence of a MI dose-effect relationship for a group format delivered intervention among HIV-infected people (19). However, to our knowledge no studies of interventions providing individual MI counseling to HIV-infected people have yet evaluated this relationship.

Self-efficacy refers to people's confidence that they can effectively perform a certain behavior under specified conditions (20). Building self-efficacy for practicing safer sex is one of the significant pathways through which safer sexual behavior change takes place in many interventions, including MI (21, 22). Counseling sessions that facilitate behavior change by building patients' self-efficacy to practice safer sex have been successful at changing risky sexual behavior (2, 23). Supporting self-efficacy and motivating people to change their behaviors are the main principles underlying MI counseling (8). Knowing how best to enhance self-efficacy for practicing safer sex is important therefore to determine. Social Cognitive Theory emphasizes the need for small, gradual steps when counseling clients' to enhance their self-efficacy (24). Spending more time conducting risk reduction counseling may provide clients with more opportunities to take those small steps to enhance self-efficacy.

This article seeks to understand the effect that dose of MI counseling has on self-efficacy to practice safer sex in a sample of PLWHA. We hypothesize that more MI counseling time and a greater number of MI counseling sessions will be associated with greater self-efficacy to practice safer sex.

2. Methods

2.1. Participants and procedures

We used data collected from July 2006 to May 2009 as part of the SafeTalk study to carry out this research. SafeTalk is a two-armed, randomized, controlled trial of a safer sex intervention conducted among 490 HIV-infected patients receiving care at one of three

clinics in North Carolina. The intervention was a multi-component, four session motivational interviewing-based safer sex program. The attention matched control program was a multi-component, four session heart healthy nutrition counseling program. In addition to receiving individual counseling, all participants were given a combined CD and workbook series.

Participants were eligible for the SafeTalk study if they: (1) were HIV infected; (2) were 18 years of age or over; (3) had sex in the past 12 months; and (4) were English-speaking. Potential participants were excluded if they: (1) were cognitively unable to provide consent; (2) were too sick to travel to clinic; (3) had participated in another "prevention with positives" program in the past 6 months; (4) were in clinic for their first visit; (5) intended to leave the clinic within the next 12 months. Recruitment was conducted through prescreening at the main site and with the help of medical providers, nurses, counselors, and social workers at the other two sites. For eligible patients who were interested in participating, the research assistant obtained informed consent after assessing their understanding of the study procedures. Please see the article by Golin et al. for additional details on the SafeTalk study design, procedures and outcomes (25).

2.2. Content and Process of the SafeTalk Motivational Interviewing Intervention

Master's level-trained counselors implemented both the intervention and control programs. Both were designed to deliver four counseling sessions approximately four weeks apart for sixteen weeks.

The MI intervention included three components: 1) four MI counseling sessions; 2) a series of 4 CD/workbook pairs that participants received before each MI; and 3) confidential individualized booster letters sent between sessions which reviewed issues raised in the MI session (26). All components targeted two main factors: enhancing motivation and self-efficacy to practice safer sex.

Before each MI session, participants used a CD/workbook pair to perform three exercises that prepared them for the MI: values clarification; choosing a safer sex topic; rating importance and self-efficacy for the topic. Counselors then reviewed the completed exercises with clients as they guided them through a standard 13-step MI session that: 1) assessed their current relationship status and sexual activities; 2). provided a menu of safer sex topics to choose from; 3) assessed clients' motivation and self-efficacy to address chosen topic; 4) identified barriers and facilitators to behavior change; 5) helped formulate goals and specific strategies; 6) weighed pros and cons; and 7) set a concrete plan (27). Other steps included activities to build rapport, provide safer sex information, establish continuity, arrange follow-up, and create closure at appropriate points in the session. The menu of topics from which clients could choose included: "telling someone I am HIV-positive", "using condoms", "how to be safer during sex", "having sex with someone who is HIV-positive". Each individual MI session length was flexibly determined by counselor and client together but lasted 40 minutes on average.

All seven study counselors received 20 hours of MI training conducted by a MINT (Motivational Network of Trainers) trainer (CEG). Sessions were audio-recorded if participants granted consent. To enhance intervention quality, counselors reviewed their sessions weekly with a licensed, trained clinical counselor; the entire team met monthly with the clinical supervisor and principal investigator to discuss counseling sessions. These reviews focused on improving MI technique, managing difficult cases, and resolving ethical dilemmas. Most of the MI sessions were delivered face to face. Receiving telephone MI counseling was offered to participants with transportation problems. Among those who received any counseling, 15% received some telephone counseling and three percent

received only telephone counseling. Every effort was made to ensure that participants received all their MI counseling sessions from the same counselor, and 95% did so.

2.3. Study Instruments

Evaluation surveys were administered to study participants at baseline, four, eight, and twelve month visits. Data were collected using audio computer-assisted self-interviews (ACASI). Each interview took place in the clinics, and lasted approximately 40 minutes.

To assess MI session fidelity, immediately after each MI session counselors recorded the content of the session on standardized recording sheets. Counselors also recorded time spent counseling and whether counseling was delivered by phone.

Participants received $15, a parking pass, and a $5 meal voucher for each counseling session, and $25 and a parking pass for each completed survey. The study procedures were approved by the UNC institutional review board.

2.4. Dependent Variable of Interest

2.4.1. Self-efficacy to practice safer sex—We measured self-efficacy to practice safer sex using a sixteen-item scale. The scale was adapted from the scales developed by Grimley et al. and Parsons et al. (28, 29). The original scales had good psychometric properties, and were used in several settings (28, 29). The self-efficacy scale used for the SafeTalk study assessed participants' confidence to conduct a range of 16 tasks required to practice safer sex (e.g., talking about safer sex with a sexual partner, using a condom correctly, using a condom in potentially tempting situations, and negotiating safer sex with sex partners). Response options for each of the 16 items on the 11-point scale ranged from zero for "not at all confident" to ten for "completely confident".

A self-efficacy score for each participant was derived by taking the mean of all responses to the 16 items of the scale (potential range for scale 0–10). We excluded an observation from our analysis if it had more than four missing values (i.e., more than 25%) on the 16 items. As a result, 18 out of 1577 observations (0.01%) were excluded. The internal consistency reliability for the safer sex self-efficacy scale in our sample was high (Cronbach's alpha = 0.92).

2.5. Independent Variables of Interest

2.5.1. Amount of motivational interviewing counseling time—Although the ideal window was for all four counseling sessions to be completed before the four month survey, some participants did not stay on schedule, and received some of their counseling sessions between the four and eight month surveys (n=102). By design, no counseling sessions took place after the eight month survey. To calculate the total amount of counseling time provided to a study participant (dose), we first defined two time intervals: 1) time period 1 was the time period between completion of the baseline survey and the four month follow-up survey; 2) time period 2 was the period between completion of the 4 month follow-up survey and the 8 month follow up survey. Dose per interval was then calculated by summing all of the counseling time participants received during time period 1 and similarly for time period 2. We used this information to cumulate total counseling time received by each time point.

To facilitate interpretation of the results, we used these data to create three categories for the amount of counseling time received (total number of observations for the sample of 490 participants =1577). The first group was a "zero dose category" of those participants who received zero minutes of counseling. This group included all observations at which no dose

was yet received, including all baseline values and all observations from the 242 people in the control group (67.7%, number of observations = 1067). Since five minutes was the lowest amount of MI time provided, the second group, labeled low to moderate dose group, included those observations where between 5 to 131 minutes were received (15.3%, number of observations = 241). The third group, the high dose group, included observations where 132 to 330 minutes total were received (17%, number of observations = 269). We used a median (131 minutes) as the cut point between the "low to moderate" and "high" dose groups.

2.5.2. Number of counseling sessions—The total number of counseling sessions provided by counselors to participants was also abstracted from the data recording sheets. Similar to the calculation for the amount of counseling time, the number of counseling sessions per interval was calculated by summing all of the counseling sessions participants received during time period 1 and time period 2. The total number of sessions was cumulative over time.

We created three categories for the number of MI counseling sessions: zero sessions (67.7%, number of observations = 1067 including control participants); one to two sessions (8.2%, number of observations = 129); and three to four sessions (24.1%, number of observations = 381).

2.6. Covariates of interest

Because MI dose was not randomly assigned, we measured and controlled for potential confounders, which we selected based on an *a priori* conceptual model of factors informed by the literature and associated with each of the independent and dependent variables of interest. These included: 1) demographic factors (age, educational attainment, sexual identity); 2) clinical factors (duration of HIV diagnosis, having an undetectable HIV viral load); 3) counseling factors (clinic site, counselor, proportion of sessions done by telephone, history of previous MI study enrollment); and 4) psychosocial factors (binge drinking, cocaine/crack use, motivation to practice safer sex, having a main partner and being sexually active). Binge drinking was defined as five or more drinks of alcohol for men and four or more drinks for females in a single day at least once in the last three months. Participants were considered crack/cocaine users if they answered "yes" to any use in the last three months of crack, freebase, rock or powder cocaine. To measure motivation to practice safer sex, we used a six item scale adapted from the Sex Check study (30). A motivation to practice safer sex score for each of the participants was derived by taking the mean of all items of a 4-point Likert scale (1=not at all motivated to 4=totally motivated). We defined having a primary relationship as living with or seeing someone a lot, feeling a special emotional commitment). Participants were considered sexually active if they reported anal/vaginal intercourse in the past 3 months.

2.7. Analysis

We conducted a descriptive analysis of the study cohort, examined changes in self-efficacy to practice safer sex among participants over all four study assessments, and the association between self-efficacy and categories of counseling time. Our attrition analysis examined characteristics of study participants lost to follow-up. For this analysis, we conducted logistic regression with participants being present at 12 month follow up as the dependent variable. Demographic, sexual behavior variables at the baseline and counselor identity were the potential predictor variables that we assessed.

We conducted linear regression analysis for longitudinal data using the PROC MIXED procedure in SAS 9.2. (SAS Institute, Cary, NC) since observations for a cohort over time

were correlated within each study participant. A two-level model was used in which units in the first level were study assessments (baseline, 4 months follow up, 8 months follow up and 12 months follow up) that were nested within the units in the second level (study participants). The statistical analysis included all data collected for each study participant at each of the assessments regardless of a participant's intervention exposure.

To handle missing data we conducted multiple imputation using PROC MI to generate possible values. We then used standard SAS procedures to test hypotheses in each of the ten imputed data sets and then PROC MIANALYZE to combine results across the multiply imputed data to produce a single set of test statistics, parameter estimates and standard errors (31).

We first conducted a global test to see whether there were significant differences in the influence of different categories of counseling time on safer sex self-efficacy. A similar test was conducted with the second independent variable of interest, number of counseling sessions. Then we contrasted different categories of the two independent variables, separately, to test the study hypotheses, adjusting for all potential confounders.

3. Results

3.1. Study cohort

The sample of 490 study participants consisted of 185 men who had sex with men, 130 men who had sex with women and 161 women who had sex with men. There were 248 participants in the intervention group and 242 participants in the control group. Participants had a mean age of 42.6 years (SD=9.04), 71% were African Americans, 64% were male, 24.6% had less than a high school education, 57.5% earned less than $10,000 per year (See Table 1).

In the intervention group, 21.8% (n=54) of the participants did not show up to receive any MI counseling (and therefore no sessions), 33.9% (n=84) received 1–131 minutes of counseling time, and 44.4% (n=110) received 132–320 minutes of counseling time. For number of counseling sessions, 14.91% (n=37) received 1–2 counseling sessions and 63.31% (n=157) received 3–4 counseling sessions (See Figure 1).

The logistic regression analysis showed that participants' absence at the last follow up was associated with fewer years since diagnosis (OR=0.96, p=0.0258) and more motivation to practice safer sex at baseline (OR=1.56, p=0.0018). Homosexual men were more likely to be lost to follow up (OR=1.93, p=0.008) compared to females. We found no other differences between those who were and were not lost to follow-up.

3.2. Changes in self-efficacy to practice safer sex over time

In the analysis of changes in self-efficacy over time, the significant fixed effects reflected that the mean level of self-efficacy to practice safer sex at baseline was 8.21 (se=0.09) (out of a potential score of 0–10) and self-efficacy increased by 0.14 (se=0.023) per every assessment. There was significant covariance between the intercepts and slopes and the standardized correlation of –0.29. This covariance indicated that participants who reported higher self-efficacy at the baseline visit tended to increase self-efficacy more slowly over time.

3.3. Effect of the dose of motivational interviewing counseling on self-efficacy to practice safer sex

Figure 2 shows that the mean of self-efficacy to practice safer sex increased by categories of the amount of counseling time, unadjusted for potential confounders. Overall, with controls

present in the models, self-efficacy increased as the number of counseling sessions and number of minutes of counseling increased (p<0.0001). Participants provided low to moderate doses of MI counseling had, on average, 0.26 higher mean score on self-efficacy than did participants who received no MI counseling (p=0.01). Participants with the highest dose of MI counseling had, on average, 0.50 higher mean score on self-efficacy compared to participants who received no MI counseling (p<0.0001). They also had, on average, 0.26 higher mean score on self-efficacy compared to participants with low to moderate amounts of MI counseling time (p=0.04). Participants who received 3–4 counseling sessions had, on average, 0.41 higher mean self-efficacy score than did participants with no MI sessions (p<0.0001) but did not differ from participants receiving only 1 to 2 counseling sessions (See Table 2).

3.4. Other findings

Participants who had graduated from high school and participants with greater than high school education had, on average, greater mean self-efficacy than participants with less than a high school education (p=0.01 and p=0.003). We established a positive association between motivation to practice safer sex and self-efficacy to practice safer sex (p<0.0001). Also, cocaine or crack users had lower safer sex self-efficacy scores than participants who did not use these drugs (p=0.0001).

4. Discussion and Conclusion

4.1. Discussion

In this study we found that more MI counseling time and a greater number of MI counseling sessions were both associated with greater self-efficacy to practice safer sex. These findings have critical implications because enhancing self-efficacy has been shown in multiple settings to enhance health behaviors that are linked to health outcomes (13, 32, 33).

Our findings are consistent with previous research, which has established an association between the duration of MI counseling, the number of encounters clients have with counselors, and the likelihood of achieving an effect (16, 18), although ours is the first study that we are aware of to look specifically at the effects of MI dose on self-efficacy among PLWHA. Polcin et al. has speculated that providing more MI counseling may permit the client more time to remain in a pre-contemplation stage and work through any ambivalence he or she may have during the contemplation stage (34). Our finding suggests that the mechanism by which this effect occurs may act via the self-efficacy pathway.

In addition to our main study finding regarding the effects of dose, we found several other variables related independently to the level of self-efficacy to practice safer sex, after controlling for exposure to the intervention. Our study supported previous research findings that people with lower education tend to have lower self-efficacy to practice safer sex (35, 36). Also, the positive association between drug use and unsafe sex behavior is documented across many studies of PLWHA (37–40) although it has not previously been shown specifically to relate to self-efficacy. The association we found between cocaine and crack use and lower self-efficacy to practice safer sex helps us to understand a potential mechanism by which drug use may affect risky sexual behavior. While we did not aim to establish with this one study the nature of the relationship between dose, self-efficacy to practice safer sex and motivation to practice safer sex, the association we found between self-efficacy and motivation to practice safer sex confirms the importance of aiming health behavior interventions at changing each of these constructs.

Study strengths include the use of a longitudinal design with a diverse sample and repeated measures. These factors provide us with greater confidence in establishing causality

compared to using data from a cross-sectional design or from a more homogeneous sample, by offering information about the temporality of change and generalizability of the findings. These factors also allow us to address several alternative explanations for the effects we found, such as the existence of omitted variables. The changes we observed occurred over time within an individual, with every person serving as his or her own control (41).

Our study has several limitations. Because of the sensitive and private nature of sexual health and sexual activity, the study used self-reported data from participants rather than observational data. Self reported data are subject to social desirability and recall biases (42). These biases were minimized in the study by using computer-assisted interviewing techniques (43, 44) and asking questions related to the last three month time period rather than the past month (45). Also, to measure self-efficacy to practice safer sex, we used a scale with good validity and high reliability.

Absence of randomization limits our ability to establish causal relationship between the dose of MI counseling and self-efficacy to practice safer sex. For example, it is possible that those participants who were more motivated to change their behavior received more counseling time and attended more sessions than participants who were less motivated. In contrast, it is also possible that counselors provided more MI time to participants with higher risk sexual behavior compared to participants with lower sexual risk behavior. Also if the quality of counseling had been unequal across counselors, patients may have stayed longer or come back more due to receipt of better quality MI. However, our attrition analysis revealed no difference by counselor. We did find that participants with higher motivation to practice safer sex were more likely to be lost to follow up than participants with lower motivation. Nevertheless, we were able to establish an association between dose of counseling and self-efficacy for the sample of participants who were less motivated to practice safer sex. Also, participants may have increased their confidence that they could practice safer sex as a result of being exposed to the survey questions or because of local events (such as health promotion campaigns) happening during the study period. Although only randomization to a condition may address these threats to internal validity, we minimized them by controlling for potential confounding variables in the analysis.

Finally, threats to external validity exist in this study because the study sites were not randomly chosen for the intervention. Therefore, we should exercise caution in generalizing the study findings beyond the population of HIV-positive patients who attended the three study clinic sites or to populations similar to these participants. Also, our finding about lower increase in self-efficacy among participants with higher self-efficacy at baseline could be explained by a ceiling effect. Because self-efficacy to practice safer sex at baseline was quite high in general (mean = 8.31, SD=1.78), we may be underestimating the potential effect that the intervention might have had on riskier groups of participants.

4.2. Conclusion

The results of our analysis suggest that, at least for HIV "prevention with positives" programs, the overall amount of counseling time, whether measured in number of counseling sessions or minutes spent being counseled, is a key to promoting self-efficacy to practice safer sex.

4.3. Practice implications

When given the opportunity, HIV-infected clients selected topics related to safer sex to discuss with a counselor. The more time the clients spent discussing these topics, the more likely they were to change their behavior. Practitioners working with HIV-infected patients should pay attention to the amount of time they devote to these clients. While our findings

may appear to contrast with current trends to constrain budgets, it may be that investing more time with clients to build their self-efficacy through gradual steps will enable them to make sustainable changes, thereby avoiding the need to spend more time in clinic later. Our findings provide evidence that spending more time counseling people living with HIV can positively affect patient and public health outcomes.

Acknowledgments

References

1. Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. Aids. 2006; 20(10):1447. [PubMed: 16791020]

2. Kalichman SC, Rompa D, Cage M, DiFonzo K, Simpson D, Austin J, et al. Effectiveness of an intervention to reduce HIV transmission risks in HIV-positive people. American Journal of Preventive Medicine. 2001; 21(2):84–92. [PubMed: 11457627]

3. Fisher JD, Cornman DH, Osborn CY, Amico KR, Fisher WA, Friedland GA. Clinician-Initiated HIV Risk Reduction Intervention for HIV-Positive Persons: Formative Research, Acceptability, and Fidelity of the Options Project. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2004; 37:S78.

4. Blackard JT, Cohen DE, Mayer KH. Human Immunodeficiency Virus Superinfection and Recombination: Current State of Knowledge and Potential Clinical Consequences. Clinical Infectious Diseases. 2002; 34(8):1108–14. [PubMed: 11915000]

5. Blackard JT, Mayer KH. HIV Superinfection in the Era of Increased Sexual Risk-Taking. Sexually transmitted diseases. 2004; 31(4):201. [PubMed: 15028931]

6. Smith DM, Richman DD, Little SJ. HIV Superinfection. Journal of Infectious Diseases. 2005; 192(3):438–44. [PubMed: 15995957]

7. Crepaz N, Lyles CM, Wolitski RJ, Passin WF, Rama SM, Herbst JH, et al. Do prevention interventions reduce HIV risk behaviours among people living with HIV? A meta-analytic review of controlled trials. Aids. 2006; 20(2):143. [PubMed: 16511407]

8. Miller, WR.; Rollnick, S. Motivational Interviewing: Preparing People to Change Addictive Behavior. Guilford Press; New York: 1991. p. 326

9. Bryan AD, Fisher JD, Fisher WA, Murray DM. Understanding Condom Use among Heroin Addicts in Methadone Maintenance Using the Information-Motivation-Behavioral Skills Model. Substance use & misuse. 2000; 35(4):451–71. [PubMed: 10741537]

10. DiIorio C, Resnicow K, McDonnell M, Soet J, McCarty F, Yeager K. Using Motivational Interviewing to Promote Adherence to Antiretroviral Medications: A Pilot Study. Journal of Association of Nurses in AIDS Care. 2003; 14(2):52–62.

11. Kalichman SC, Kelly JA, Rompa D. Continued high-risk sex among HIV seropositive gay and bisexual men seeking HIV prevention services. Health psychology(Hillsdale, NJ). 1997; 16(4): 369–73.

12. Naar-King S, Wright K, Parsons JT, Frey M, Templin T, Lam P, et al. Healthy Choices: Motivational Enhancement Therapy for Health Risk Behaviors In HIV-Positive Youth. AIDS Education & Prevention. 2006; 18(1):1–11. [PubMed: 16539572]

13. Parsons JT, Golub SA, Rosof E, Holder C. Motivational Interviewing and Cognitive-Behavioral Intervention to Improve HIV Medication Adherence Among Hazardous Drinkers: A Randomized Controlled Trial. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2007; 46(4):443.

14. Miller, WR. Motivational enhancement therapy manual: A clinical research guide for therapists treating individuals with alcohol abuse and dependence. Diane Pub Co; 1995. p. 8

15. Miller, WR.; Rollnick, S. Motivational interviewing: Preparing people for change. The Guilford Press; 2002.

16. Rubak S, Sandbæk A, Lauritzen T, Christensen B. Motivational interviewing: a systematic review and meta-analysis. The British Journal of General Practice. 2005; 55(513):305. [PubMed: 15826439]

17. Rollnick S, Miller WR. What is motivational interviewing? Behavioural and cognitive psychotherapy(Print). 1995; 23(4):325–34.

18. Burke BL, Arkowitz H, Menchola M. The Efficacy of Motivational Interviewing: A Meta-analysis of Controlled Clinical Trials. Year Book of Psychiatry & Applied Mental Health. 2005; 2005:98–9.

19. Holstad MMD, DiIorio C, Kelley ME, Resnicow K, Sharma S. Group Motivational Interviewing to Promote Adherence to Antiretroviral Medications and Risk Reduction Behaviors in HIV Infected Women. AIDS and Behavior. :1–12.

20. Bandura, A. Self-efficacy: the exercise of control. 1997.

21. O'Leary A, Jemmott LS, Jemmott JB Iii. Mediation analysis of an effective sexual risk-reduction intervention for women: The importance of self-efficacy. Health Psychology. 2008; 27(2):S180–S4. [PubMed: 18377160]

22. NIMH. The NIMH Multisite HIV Prevention Trial Group. Social cognitive theory mediators of behavior change in The NIMH Multisite HIV Prevention Trial. Health Psychol. 2001; 20:369–76. [PubMed: 11570651]

23. Butler RB, Schultz JR, Forsberg AD, Brown LK, Parsons JT, King G, et al. Promoting safer sex among HIV-positive youth with haemophilia: theory, intervention, and outcome. Haemophilia. 2003; 9(2):214–22. [PubMed: 12614374]

24. Baranowski T, Perry CL, Parcel GS. How individuals, environments, and health behavior interact. Book Chapter. 2002:165–84.

25. Golin CE, Davis RA, Przybyla SM, Fowler B, Parker S, Earp JA, et al. SafeTalk, a Multicomponent, Motivational Interviewing-Based, Safer Sex Counseling Program for People Living with HIV/AIDS: A Qualitative Assessment of Patients' Views. AIDS patient care and STDs 2010 April 16. 2010; 24(4):1073–6.

26. Adamian MS, Golin CE, Shain LS, DeVellis B. Brief Motivational Interviewing to Improve Adherence to Antiretroviral Therapy: Development and Qualitative Pilot Assessment of an Intervention. AIDS Patient Care and STDs. 2004; 18(4):229–38. [PubMed: 15142353]

27. Miller, WR.; Rollnick, S.; Moyers, TB. Motivational interviewing: Professional training videotape series. Albuquerque, NM: The University of New Mexico; 1998.

28. Grimley DM, Prochaska GE, Prochaska JO, Velicer WF, Galavotti C, Cabral RJ, et al. Cross-Validation of Measures Assessing Decisional Balance and Self-Efficacy for Condom Use. American Journal of Health Behavior. 1996; 20(6):406–16.

29. Parsons JT, Halkitis PN, Bimbi D, Borkowski T. Perceptions of the benefits and costs associated with condom use and unprotected sex among late adolescent college students. Journal of adolescence. 2000; 23(4):377–91. [PubMed: 10936012]

30. Picciano JF, Roffman RA, Kalichman SC, Rutledge SE, Berghuis JP. A telephone based brief intervention using motivational enhancement to facilitate HIV risk reduction among MSM: A pilot study. AIDS and Behavior. 2001; 5(3):251–62.

31. Rubin, DB. Multiple imputation for nonresponse in surveys. Wiley-IEEE; 2004.

32. Wolf MS, Davis TC, Osborn CY, Skripkauskas S, Bennett CL, Makoul G. Literacy, self-efficacy, and HIV medication adherence. Patient education and counseling. 2007; 65(2):253–60. [PubMed: 17118617]

33. DiIorio C, Dudley WN, Soet J, Watkins J, Maibach E. A social cognitive-based model for condom use among college students. Nursing research. 2000; 49(4):208. [PubMed: 10929692]

34. Polcin DL, Galloway GP, Palmer J, Mains W. The Case for High-Dose Motivational Enhancement Therapy. Substance use & misuse. 2004; 39(2):331–43. [PubMed: 15061564]

35. Marín BV, Tschann JM, Gomez CA, Gregorich S. Self-efficacy to use condoms in unmarried Latino adults. American Journal of Community Psychology. 1998; 26(1):53–71. [PubMed: 9574498]

36. Reynolds NR, Testa MA, Marc LG, Chesney MA, Neidig JL, Smith SR, et al. Factors influencing medication adherence beliefs and self-efficacy in persons naive to antiretroviral therapy: a multicenter, cross-sectional study. AIDS and Behavior. 2004; 8(2):141–50. [PubMed: 15187476]

37. Benotsch EG, Kalichman SC, Kelly JA. Sexual compulsivity and substance use in hiv-seropositive men who have sex with men Prevalence and predictors of high-risk behaviors. Addictive Behaviors. 1999; 24(6):857–68. [PubMed: 10628518]

38. Kennedy CA, Skurnick J, Wan JY, Quattrone G, Sheffet A, Quinones M, et al. Psychological distress, drug and alcohol use as correlates of condom use in HIV-serodiscordant heterosexual couples. Aids. 1993; 7(11):1493. [PubMed: 8280417]

39. Wilson TE, Massad LS, Riester KA, Barkan S, Richardson J, Young M, et al. Sexual, contraceptive, and drug use behaviors of women with HIV and those at high risk for infection: results from the Women's Interagency HIV Study. AIDS. 1999; 13(5):591–8. [PubMed: 10203384]

40. Morin SF, Myers JJ, Shade SB, Koester K, Maiorana A, Rose CD. Predicting HIV Transmission Risk among HIV-Infected Patients Seen in Clinical Settings. AIDS and Behavior. 2007; 11:6–16.

41. MacKinnon, DP. Introduction to statistical mediation analysis. Lawrence Erlbaum Associates; 2008.

42. Fisher RJ. Social desirability bias and the validity of indirect questioning. Journal of Consumer Research. 1993:303–15.

43. Gribble JN, Miller HG, Rogers SM, Turner CF. Interview Mode and Measurement of Sexual Behaviors: Methodological Issues. The Journal of Sex Research. 1999; 36(1):16–7.

44. Turner CF, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. Science. 1998; 280(5365):867. [PubMed: 9572724]

45. Schroder KEE, Carey MP, Vanable PA. Methodological challenges in research on sexual risk behavior: II. Accuracy of self-reports. Annals of Behavioral Medicine. 2003; 26(2):104–23. [PubMed: 14534028]

```
┌──────────────┐        ┌──────────────┐              ┌──────────────┐
│ No Dose,     │        │ Low to Moderate│            │ High Dose,   │
│ n=54         │        │ Dose, n=84   │              │ n=110        │
└──────────────┘        └──────────────┘              └──────────────┘
      │                    ╱        ╲                    ╱        ╲
┌──────────────┐  ┌──────────┐ ┌──────────┐  ┌──────────┐ ┌──────────┐
│ No           │  │ 1-2      │ │ 3-4      │  │ 1-2      │ │ 3-4      │
│ counseling   │  │ sessions,│ │ sessions,│  │ sessions,│ │ sessions,│
│ sessions,    │  │ n=36     │ │ n=48     │  │ n=1      │ │ n=109    │
│ n=54         │  └──────────┘ └──────────┘  └──────────┘ └──────────┘
└──────────────┘
```
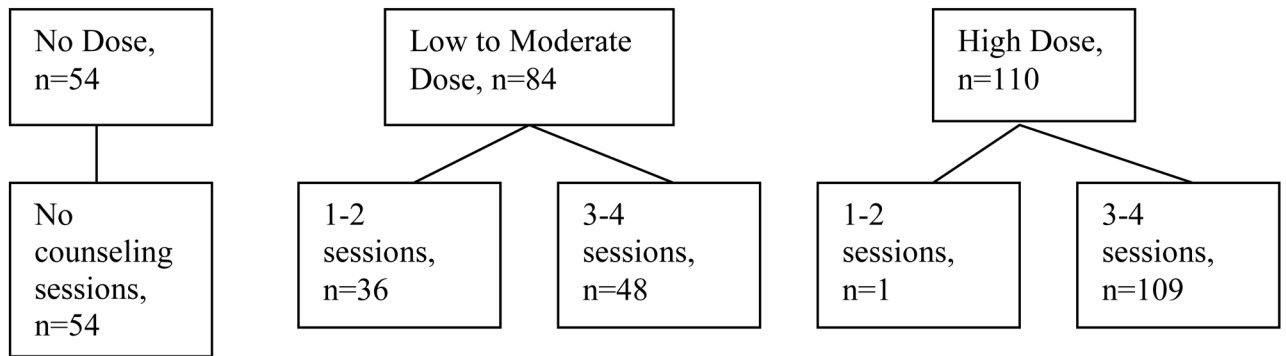
Figure 1.
Distribution of Intervention Group Participants by Dose (in minutes of counseling time) and Number of Sessions Received (N=248)
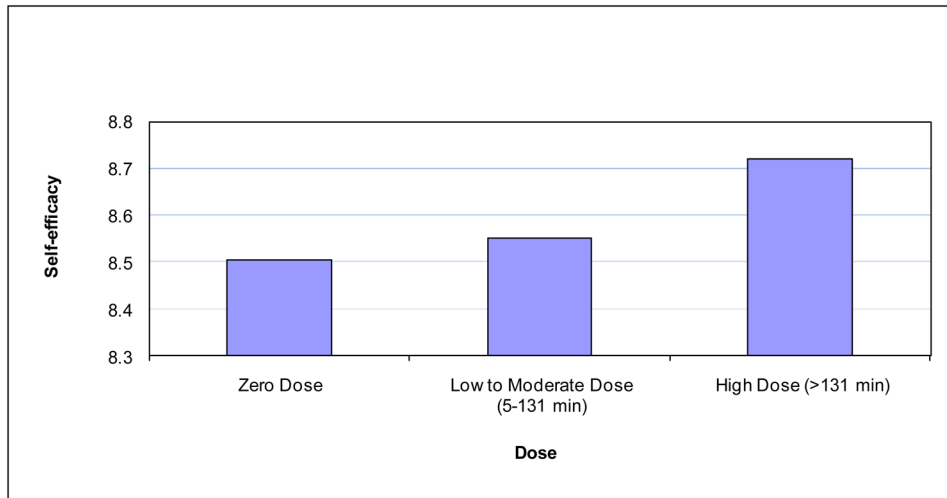
Figure 2.
Self-Efficacy Means by Amount of Counseling Time

Table 1

Baseline Descriptive Characteristics of the Study Sample (N=490)

	N	%
Demographics		
Age (N, Mean (SD))	487	42.6(9.04)
Ethnicity		
African American	347	71.11
White	100	20.49
Other	41	8.40
Education		
Less than High School	120	24.59
High School	162	33.20
More than High School	206	42.21
Income		
$10,000 or less	267	57.54
$10,001 to $40,000	160	34.48
More than $40,000	37	7.97
Gender		
Female	172	**35.1**
Male	315	**64.29**
Transgender (Male to Female)	2	0.41
Transgender (Female to Male)	1	0.20
Sexual Orientation		
Men having sex with men	185	38.87
Men having sex with women	130	27.31
Women having sex with men	161	33.82
Clinical Characteristics		
Duration of diagnosis (N, Mean (SD))	484	9.53(6.18)
CD4 count < 200	80	18.10
Viral Load		
Undetectable	249	50.92
Detectable	187	38.24
Unaware	53	10.84
Currently on HAART	389	79.39
Behavioral Characteristics		
Substance Use		
Binge drinking in past 3 months	192	40.08
Cocaine/crack use in past 3 months	89	19.06
Sexual behavior		
Had main sex partner	270	56.60
Sexually active in past 3 months	256	52.24

Table 2

Effect of the Amount of MI Counseling Time and Number of MI Counseling Sessions on Self-efficacy to Practice Safer Sex in Multivariate Analysis[*] (N=1577)

Contrast	Estimate (se)	t-Value	Pr> |t|
Amount of MI Counseling Time			
Low to Moderate vs. Zero Dose	0.26 (0.10)	2.61	0.0090
High vs. Zero Dose	0.50 (0.10)	5.19	<0.0001
High vs. Low to Moderate Dose	0.26 (0.13)	2.01	0.0440
Number of MI Counseling Sessions			
1–2 Sessions vs. 0 Sessions	0.21 (0.13)	1.61	0.1076
3–4 Sessions vs. 0 Sessions	0.41 (0.09)	4.74	<0.0001
3–4 Sessions vs. 1–2 Sessions	0.21 (0.13)	1.59	0.1108
Selected control variables			
High School Education	0.42 (0.16)	2.58	0.0099
Greater than High School Education	0.50 (0.17)	2.96	0.0031
Motivation to practice safer sex	0.80 (0.07)	12.11	<0.0001
Cocaine or Crack Use	0.42 (0.11)	3.90	0.0001

[*] Controlling for age, educational attainment, having a main partner, being sexually active, sexual identity, date of HIV diagnosis, having an undetectable HIV viral load, clinic site, counselor, proportion of counseling sessions done by telephone, history of previous enrollment in a study providing MI counseling, binge drinking in the last three months, cocaine/crack use in the last three months, and motivation to practice safer sex.