

Intervention

Does motivational interviewing counseling time influence HIV-positive persons' self-efficacy to practice safer sex?

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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 min) and high (132–320 min) 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.

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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 [2,3]. 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 3 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,

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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 the control programs. Both were designed to deliver four counseling sessions approximately 4 weeks apart for 16 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 min on average.

All seven study counselors received 20 h 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 3% 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, 4, 8, and 12 month visits. Data were collected using audio computer-assisted self-interviews (ACASI). Each interview took place in the clinics, and lasted approximately 40 min.

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 10 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 4 month survey, some participants did not stay on schedule, and received some of their counseling sessions between the 4 and 8 month surveys ($n = 102$). By design, no counseling sessions took place after the 8 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 4 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 5 min was the lowest amount of MI time provided, the second group, labeled low to moderate dose group, included those observations where between 5 and 131 min were received (15.3%, number of observations = 241). The third group, the high dose group, included observations where 132–330 min total were received (17%, number of observations = 269). We used a median (131 min) 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 3 months. Participants were considered crack/cocaine users if they answered “yes” to any use in the last 3 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

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

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 min of counseling time, and 44.4% (n = 110) received 132–320 min 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 Fig. 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

Fig. 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

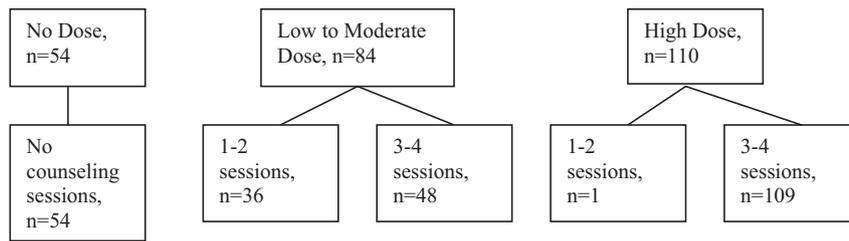


Fig. 1. Distribution of intervention group participants by dose (in minutes of counseling time) and number of sessions received (N = 248).

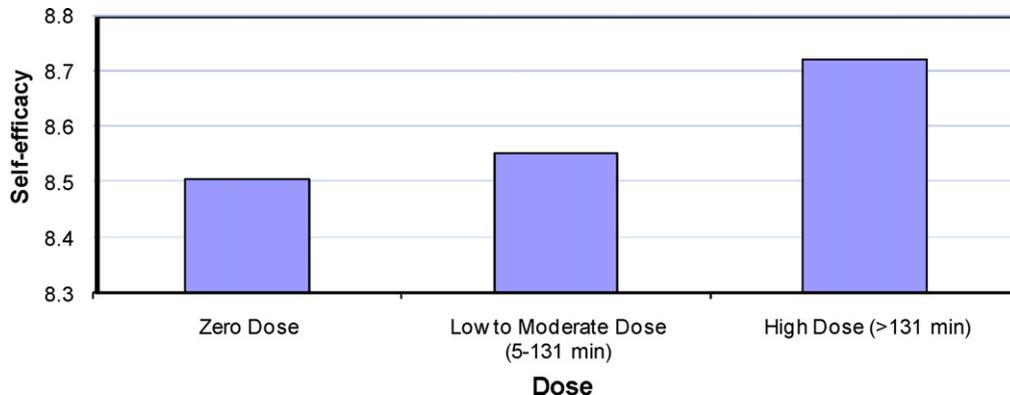


Fig. 2. Self-efficacy means by amount of counseling time.

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^a (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

^a 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 3 months, cocaine/crack use in the last 3 months, and motivation to practice safer sex.

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 1–2 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 using computer-assisted interviewing techniques [43,44] and asking questions related to the last 3 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.

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