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Does the quality of safetalk motivational interviewing counseling predict sexual behavior outcomes among people living with HIV?

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ABSTRACT

Objective: Although past research has demonstrated a link between the quality of motivational interviewing (MI) counseling and client behavior change, this relationship has not been examined in the context of sexual risk behavior among people living with HIV/AIDS. We studied MI quality and unprotected anal/vaginal intercourse (UAVI) in the context of SafeTalk, an evidence-based secondary HIV prevention intervention.

Methods: We used a structured instrument (the MISC 2.0 coding system) as well as a client-reported instrument to rate intervention sessions on aspects of MI quality. Then we correlated client-reported UAVI with specific counseling behaviors and the proportion of interactions that achieved MI quality benchmarks.

Results/Conclusion: Higher MISC-2.0 global ratings and a higher ratio of reflections to questions both significantly predicted fewer UAVI acts at 8-month follow-up. Analysis of client ratings, which was more exploratory, showed that clients who rated their sessions higher in counselor acceptance, client disclosure, and relevance reported higher numbers of UAVIs, whereas clients who selected higher ratings for perceived benefit were more likely to have fewer UAVI episodes.

Practice implications: Further research is needed to determine the best methods of translating information about MI quality into dissemination of effective MI interventions with people living with HIV.

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1. Introduction

Motivational Interviewing (MI) is an intervention strategy that has demonstrated effectiveness in impacting multiple health behaviors. MI is a directive, client-centered counseling approach that relies on patients' intrinsic motivation for health and enhances confidence to engage in healthy behaviors, primarily through exploring and resolving ambivalence [6]. MI is a collaborative style of counseling that attends to the language of change and is designed to strengthen personal motivation for and commitment

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to a specific goal [6]. MI practitioners utilize techniques such as reflective listening, open-ended questions, and affirming statements to develop rapport, raise awareness of ambivalence, and elicit behavior change in clients, and avoid MI inconsistent techniques such as advising without permission, directing, or warning which may interfere with rapport-building and hinder behavior change [7].

MI has demonstrated effectiveness in improving health behaviors among people living with HIV, including increasing ARV medication adherence [8–14], reducing substance use, and reducing risky sexual behaviors such as condomless sex [8,10,16–19]. The SafeTalk intervention is one MI-based secondary HIV prevention program that significantly reduced HIV-infected patients' condomless sex with at-risk partners in comparison with an attention control arm [16]. Further analyses demonstrated that the amount of time participants spent in MI counseling predicted the amount of reduction in condomless sex acts, and that this effect was mediated by changes in their self-efficacy to practice safer sex [20].

As the basic efficacy and effectiveness of MI has been established, research has increasingly focused on understanding how MI works and methods of measuring and assuring counseling quality [21]. Multiple coding systems have been developed and tested for the purpose of coding MI counselor and client behaviors and rating sessions for aspects of quality and fidelity [21]. In a recent meta-analysis of studies utilizing such coding systems, Magill [22] tested and partially validated a key causal model of MI efficacy in which therapist behaviors that are either consistent or inconsistent with MI correlate with client "change talk" (language in favor of behavior change), which mediated an overall effect on behavior change [22]. Thrasher [14] found that certain MI-consistent behaviors and global session ratings were associated with improvements in ARV adherence among people living with HIV [14]. However, in a recent systematic review and meta-analysis of MI to reduce sexual risk behavior among people living with HIV, Naar-King [8] found that few studies utilized the "gold standard" of coding session recordings and concluded that future studies should consider using coding as a best fidelity practice [8].

In this paper, we explore aspects of intervention quality and their effects on sexual risk reduction in the aforementioned SafeTalk intervention, which was delivered among people living with HIV in the Southeast US [16]. We sought to answer two main questions: 1) what was the quality of SafeTalk MI sessions? and 2) did higher MI quality predict greater reductions in condomless sex?

Additionally, little is known about alternative methods of assessing MI quality that do not involve a coding system, which can be time-consuming and labor intensive. Other counseling rating systems have found benefit in assessing clients themselves on aspects of their counseling experience. For example, the Working Alliance Inventory (WAI) [23] has been shown to correlate with psychotherapy outcomes, and can be completed by clients or therapists in addition to observers. Client WAI ratings have been found to predict therapeutic outcomes even more strongly than therapist and observer ratings, suggesting that clients may have unique and valuable perspectives on counseling benefit [23]. However, no such measure has been developed or tested for MI. Therefore, a secondary objective of this paper is to investigate the ability of a client measure to assess aspects of SafeTalk MI session quality and patient satisfaction, and to assess the correlation of this measure to an established coding system and to client behavior change.

2. Methods

2.1. Study design and intervention

This secondary analysis utilizes baseline, follow-up, and process data collected from participants in the intervention arm of the

SafeTalk randomized controlled trial study. Details about SafeTalk recruitment, intervention design, and outcomes are reported elsewhere [16]. Briefly, participants were recruited from three HIV care clinics, and eligible patients were age 18 or older, English-speaking, and self-reported having oral, anal, or vaginal sex in the last year.

Participants were randomized to receive the SafeTalk intervention or a heart-healthy counseling attention control. The intervention arm received four safer sex counseling sessions grounded in techniques of MI, delivered monthly after baseline data collection. They also received audio and printed materials to supplement and prepare for each session, as well as booster letters between sessions. Each type of counseling was delivered individually by Master's-level counselors and social workers who underwent forty hours of training from the study PI, a member of the MI Network of Trainers [24]. During the study, counselors met weekly with a clinical supervisor for individual supervision and monthly for group supervision, during which the study PI was also present; difficult cases were reviewed and opportunities for improving MI technique were discussed.

Participants completed audio computer-assisted self-interviews (ACASI) at baseline and 4-, 8-, and 12-month follow-up; this analysis utilizes baseline and 8-month data only. Surveys lasted 30–60 min, and participants were asked questions about their demographics, psychosocial factors, and sexual practices [16]. After their last counseling session, participants in both arms completed a short exit survey to rate the quality of the counseling intervention.

All study procedures were approved by the University of North Carolina at Chapel Hill's Office of Human Research Ethics.

2.2. Measurement

2.2.1. Dependent variable: condomless sex (Unprotected anal or vaginal intercourse)

Baseline and follow-up surveys assessed the number of times a participant had condomless vaginal or anal intercourse in the past 3 months. Participants were queried about the total number of times they had intercourse with HIV-positive partners, HIV-negative partners, and partners of unknown HIV status. Then they were asked, for the partners of each serostatus, during how many of their reported sex acts a condom was used from the beginning to the end of penetration, and the type of intercourse (insertive vs. receptive; anal, vaginal, or oral). The questions were asked separately by partner gender.

Participants' answers were compiled to create outcome variables indicating the number of condomless anal or vaginal sex acts. Although the main outcome for the SafeTalk trial was unprotected sex acts with at-risk (i.e., HIV-negative or unknown status) partners, the number of at-risk sex acts was insufficient to power the current MI quality analysis. For this reason, unprotected (condomless) anal or vaginal intercourse with any partner (UAVI) is the dependent variable for this paper.

2.2.2. Independent variables: MI quality

2.2.2.1. MISC-2.0 scores.

SafeTalk intervention and control sessions were audio-recorded with clients' permission; recordings were available for a total of 210 intervention sessions. Using a random number generator, we selected a random subset of 40 (~20%) audio recordings to which a team of 3 coders (CAG, CK, RDO) applied the Motivational Interviewing Skill Coding system, version 2.0 (MISC), a valid and comprehensive coding system developed for use with recorded MI sessions to encode interactions between therapists and clients [25,26]. The coders initially reviewed four sessions, counting counselor behaviors and assigning global ratings per

MISC-2.0 instructions. Afterwards, they compared their ratings and resolved discrepancies. The same three coders coded 32 of the remaining sessions individually, and all coded 4 additional randomly selected interviews to assess inter-rater consistency at regular intervals.

MISC 2 Global ratings were assigned on a seven-point Likert scale to reflect different aspects of interviewer and participant behavior. Global interviewer ratings coded included: (a) acceptance, or expressing unconditional positive regard; (b) empathy, or the extent to which the counselor understands and/or makes an effort to accurately understand the client's perspective; and (c) MI spirit, which reflects partnership, acceptance, compassion and evocation [11]. One global rating was assigned to assess the client, that of disclosure, or revealing significant information about themselves during the interview [11].

Coders assigned each counselor utterance one of 22 MISC codes that include a range of communication behaviors, each of which is believed to either facilitate or obstruct client behavior change during MI. Examples of facilitative behaviors include “affirming,” “summarizing,” and “supporting;” examples of obstructive behaviors include “directing,” “confronting,” and “advising without permission” [11]. Coders also counted the number of reflective statements, in which the counselor makes statements (not questions) seeking to understand the client's subjective experience, as well as the number of open (offering the client broad latitude and choice in how to respond) and closed (asking for yes/no, a short answer, or specific answer) questions [11].

To indicate the quality of a session, we created MI-Consistent scores as recommended in the MISC-2.0 manual [26] by calculating the ratio of the number of reflective statements to the number of

questions; the ratio of the number of open-ended questions to the total number of questions, and the ratio of the number of MI-consistent utterances to the total number of utterances.

We compared the MI-Consistent scores and the MI global ratings to established benchmarks for MI quality that have been used previously [11]; for all measures, higher scores are better.

2.2.3. Client ratings

To assess clients' perceptions of factors related to MI quality, we developed a measure based on indicators of MI fidelity established in the MISC 2.0. Using 4-point Likert scales, participants rated their counselor's empathy and acceptance, and their own disclosure of personal information during the counseling sessions (each 2 items, 6 total). Participants also rated their perceived benefit from counseling (3 items) and relevance of the sessions (1 item). Questionnaire items are listed in Table 2. This questionnaire was administered to participants via ACASI after they completed their final counseling session, which for most participants was the fourth session, but those not completing the full intervention completed the survey after their final session which may have been their first, second, or third session. Mean scores were calculated for each domain, with 3 indicating the greatest levels of the quality dimension and 0 indicating the lowest.

2.2.4. Covariates

The baseline ACASI survey assessed clinical characteristics, such as the length of time participants had been living with HIV and whether they had an undetectable viral load, and demographic features, including gender, race/ethnicity, and income. We determined subgroup based on gender and the sex of sexual partners

Table 1
Study sample baseline characteristics.

	SafeTalk intervention arm (n = 248)	Client satisfaction sub-study (n = 112)	MI coding sample (n = 32)
Demographic			
Gender			
Male	155 (64%)	65 (58%)	15 (52%)
Female	89 (36%)	47 (42%)	14 (48%)
Sex and sexual partner subgroup ^a	88 (36%)	35 (32%)	9 (32%)
MSM	67 (27%)	30 (28%)	6 (21%)
MSW	3 (1%)	44 (40%)	13 (46%)
WSM, Unsure, or Refused	6 (2%)	3 (3%)	1 (3%)
Race/ethnicity			
Black	182 (74%)	82 (74%)	24 (83%)
White	46 (19%)	18 (16%)	5 (17%)
Other	19 (8%)	11 (10%)	0 (0%)
Income			
\$10,000 or less	139 (59%)	67 (63%)	17(59%)
Clinical			
Viral load			
Undetectable	121 (48.99%)	59 (53%)	12 (41%)
Detectable	94 (38.06%)	39 (35%)	13 (45%)
Unaware	32 (12.96%)	14 (12%)	4 (14%)
Duration of diagnosis			
Number of years living with HIV, mean (SD)	9.23 (6.33)	9.97 (6.25)	9.8 (6.8)
Psychosocial and Behavioral			
Self-efficacy, mean (SD)	8.28 (1.84)	8.06 (1.87)	7.69 (2.3)
Substance use in past 3 months			
Binge drinking, N (%)	92 (39%)	43(39%)	9(31%)
Crack/cocaine use, N(%)	39 (17%)	25(23%)	9(33%)
Sexual risk behavior			
Unprotected anal or vaginal intercourse with any partner (UAVI), N (%)	57 (23.36%)	27 (24%)	7 (23%)
UAVI count, mean (SD)	3.86 (27.35) ^b	5.68 (39.70) ^b	2.17 (5.29)

^a Men who have sex with men = MSM; Men who have sex with women = MSW; Women who have sex with men = WSM. Due to small numbers, men reporting sex with both men and women were included in the MSM subgroup, and women reporting sex with both men and women were included in the WSM subgroup. Women who reported sex with only women = WSW.

^b Sample includes one large outlying sexual behavior count value of 417.

(men who have sex with men, MSM; men who have sex with women, MSW; or women who have sex with men, WSM); those who did not report any sex partners were categorized based on their gender and self-reported sexual orientation. Due to small numbers, men reporting sex with both men and women were included in the MSM subgroup, and women reporting sex with both men and women were included in the WSM subgroup. We also assessed whether participants had engaged in binge drinking and use of crack or cocaine in the past 3 months. Finally, we assessed participants' self-efficacy to use condoms with a Likert scale adapted from two previously validated self-efficacy scales [27,28].

2.3. Statistical analyses

Of 248 study participants randomized to the SafeTalk intervention arm, 183 (74%) completed an 8-month assessment. Of those who completed the 8-month assessment, 112 also completed a client exit survey, constituting the "client-rated" sample. Of the 40 participants randomly selected for MI session coding, 32 completed both a client exit survey and 8-month assessment; these 32 participants constitute the "MISC-rated" sample.

Using baseline ACASI survey data, we calculated descriptive statistics to characterize each of these samples. In order to assess the association between MI session quality and UAVI outcome, we used a zero-inflated multivariate Poisson model (ZIP). We chose a ZIP model because the outcome variable UAVI is a count variable, and it is theoretically possible that a latent group of subjects in our study population may be "ineligible" to have UAVI (e.g., engaging in abstinence due to illness, not having a partner at the time of the survey, etc.). The study population also has a group of "eligible" subjects who may have opportunities for UAVI behavior, but may experience zero events that occur according to a Poisson process. The ZIP model involves two processes, one determining that the group is eligible for non-zero response, and the other determining the count of UAVI for eligible individuals. The ZIP model jointly determines the predictors of the probability of being eligible for UAVI activity as well as the count of UAVI among the eligible

subjects. In this study we assume that structural zeros (a count of zero contributed by ineligibles) are generated by a binary distribution and the count experience is governed by a Poisson distribution (the count may include zeros contributed by eligible subjects). The models specified in this paper include the predictors that affect the probability of being eligible as well as the predictors of the UAVI count of the eligible subjects. The predictors of the probability of being eligible to engage in UAVI included study site, sex preference subgroup, binge alcohol use, cocaine/crack use, and self-efficacy score. To assess the association between quality and outcomes using the Poisson model, we ran two separate models, one each for the two quality rating methods (client-rated vs. MISC). Due to the considerable difference in size of the two samples, more covariates were included in the client-rated MI quality model ($n = 112$; covariates: gender, sex preference subgroup, income, study site, and age) than the MISC rating model ($n = 32$; covariates: sex preference subgroup, study site).

3. Results

3.1. Baseline characteristics

Baseline characteristics are presented for the SafeTalk study intervention arm and the two analytic samples in Table 1. The majority of all three subsamples were male (52–68%), black (74–83%), and reported annual incomes of \$10,000 or less (59–63%). Participants had a mean age of 42 years (range 19–70), had been living with HIV an average of 9–10 years, and less than half (35–45%) reported that their most recent viral load was undetectable. Nearly a quarter of participants reported unprotected anal or vaginal intercourse (UAVI).

3.2. MI session quality

Generally, clients rated their sessions highly on all aspects of quality, with items averaging 2.32–2.88 out of a possible 3 (Table 2). On average, the lowest-rated item was: "How much have you changed your behaviors because of the counseling?"

Table 2
Client-reported MI session quality ratings and correlation with MISC-2.0 scores.

Client-reported MI quality domain and items	Client ratings ($n = 112$) Mean (SD)
Empathy:	
Overall, how well do you think the counselor understood you? (0 = not at all, 1 = a little, 2 = some, 3 = a lot)	2.83 (0.50)
Overall, how often did you feel that the counselor saw things from your point of view? (0 = none of the time, 1 = a little of the time, 2 = some of the time, 3 = a lot of the time)	2.63 (0.70)
Acceptance:	
In general, how much did the counselor accept you completely for who you are? (0 = not at all, 1 = a little, 2 = some, 3 = a great deal)	2.88 (0.43)
How often did you feel that the counselor was judging you? (0 = all of the time, 1 = most of the time, 2 = a little of the time, 3 = none of the time)	2.77 (0.68)
Client Self-Disclosure:	
During the sessions, how often did you feel like you told the counselor important information about yourself? (0 = almost never, 1 = rarely, 2 = some of the time, 3 = almost all of the time)	2.84 (0.46)
Usefulness of counseling:	
In helping you stay healthy, how useful was the counseling? (0 = not very useful, 1 = a little useful, 2 = somewhat useful, 3 = very useful)	2.78 (0.53)
Change due to counseling:	
How much have you changed your behaviors because of the counseling sessions? (0 = haven't really changed behaviors, 1 = changed a little, 2 = changed some, 3 = changed a lot)	2.32 (0.85)
Helpfulness of counseling:	
Overall, how helpful was it to come to counseling? (0 = not very helpful, 1 = a little helpful, 2 = somewhat helpful, 3 = really helpful)	2.74 (0.55)
Relevance of counseling:	
In general, during counseling sessions you and the counselor talked about: (0 = things that aren't important to you, 1 = things that are a little important to you, 2 = things that are important but not the most important to you, 3 = things that are the most important to you)	2.80 (0.63)

MISC-2.0 scores for the 32 coded sessions are presented in Table 3. MISC-2.0 global ratings averaged between 5 and 6 on the 7-point scale, with counselor acceptance rated highest (mean 5.75) and MI spirit rated lowest (5.09). The majority of sessions (73–80%) exceeded the >5.0 benchmarks for MI proficiency established by Miller et al. [26]. All sessions met the benchmark for percent MI-consistent responses, and over half met benchmarks for ratio of reflections to questions (64.1%) and percent complex reflections (59%). However, on average, 38% of questions asked during the sessions were open questions, with the remainder being closed; accordingly, only 28% of sessions met the 50% open question benchmark, possibly due to the inclusion of several closed-ended questions in the SafeTalk protocol (for example, as part of an exercise designed to explore motivation and self-efficacy for safer sex, clients were asked to rate their levels of importance and confidence on a Likert scale).

Client-rated MI quality did not correlate significantly with their corresponding MISC-2.0 global ratings (all p 's > 0.05).

3.3. MI quality and sexual risk behavior outcomes

The zero-inflated Poisson model (Table 4) results indicate that MISC-2.0 ratings were significantly predictive of fewer UAVI acts at 8-month follow-up including global ratings of counselor acceptance, empathy, and MI spirit; the global rating of client self-exploration; and the ratio of reflections to questions.

Four client ratings were statistically significant in predicting number of UAVI acts at 8-month follow-up: counselor acceptance and client disclosure, benefit, and relevance. Clients who rated the quality of their sessions higher in counselor acceptance, client disclosure, and relevance reported higher numbers of UAVIs at 8 months, whereas clients who rated perceived benefit higher were more likely to have fewer UAVI episodes.

Interpreting the exponent of these parameter estimates as rate ratios for a one-unit increase in MI quality variables, the rate of engaging in UAVI decreased for each unit increase in MISC-2.0 counselor acceptance (46%) and MI spirit (53%), and client self-exploration (33%) scores, and ratio of reflections to questions (90%). Clients' rate of engaging in UAVI increased by 174% and 89% for each unit increase in client-rated counselor acceptance and session relevance, respectively, and decreased by 41% for each unit increase in client benefit.

4. Discussion and conclusion

4.1. Discussion

In this paper, we assessed the quality of MI sessions in SafeTalk, an effective intervention for people living with HIV designed to encourage them to reduce episodes of condomless sex, particularly

with serodiscordant partners [16], using the previously validated MISC 2.0 coding system [26] and a client-reported instrument developed for this study. We also assessed the association of each of these quality measures with condomless anal or vaginal sex. This work is a logical next step following analyses already conducted with SafeTalk data, which have demonstrated not only the efficacy of the intervention [16], but also the direct association between MI intervention dose and sexual risk reduction [20]. In preparing to disseminate the SafeTalk intervention, this is an important step in understanding which components of MI have the greatest relevance to behavior change, in this case to reduction of condomless sex for people living with HIV.

Data generated through the MISC coding process indicated that in the subsample of 32 coded SafeTalk MI sessions, the majority of sessions met established benchmarks of MI counselor proficiency [26] in all dimensions except the percent of questions that were open-ended, which may have been influenced by the closed-ended questions required in the SafeTalk MI session protocol. Overall, these findings suggest that the SafeTalk intervention may owe its effectiveness in reducing condomless sex to MI, which was delivered with fidelity.

Higher MISC-2.0 global ratings were all significantly predictive of reductions in condomless sex acts, all at similar magnitudes, consistent with other research demonstrating that counselor empathy, acceptance, and MI spirit, and client disclosure are important components of MI. These findings suggest that achieving and maintaining counselor fidelity to the MI approach will be important in dissemination of the SafeTalk intervention. Dissemination research evaluating such intervention components could be helpful in determining how to optimize the effectiveness of MI in SafeTalk.

The only MISC 2.0 summary score predicting fewer condomless sex acts was the ratio of reflections to questions, for which a one-unit increase predicted a 90% decrease in UAVI. This finding may suggest that reflective statements may be more important than questions in facilitating client self-exploration and change talk in sexual risk reduction topics, which are potentially sensitive and, in the case of people living with HIV, carry risk of legal consequences in states that criminalize unprotected sex by an HIV-infected partner.

The results of our exploratory research into client-rated aspects of MI quality are less clear. In particular, three of the same dimensions evaluated in MISC-2.0 had different relationships with risky sex outcomes when rated by clients. When rated by clients, higher counselor acceptance and client disclosure were associated with higher, rather than lower, numbers of unprotected sex acts at 8 months. Empathy, which significantly predicted risk outcomes in the MISC-2.0 analysis, was not associated with outcomes as rated by clients. Although the client rating tool we developed for this project lacks validity in detecting the specific aspects of empathy

Table 3
Motivational Interviewing Skill Code (MISC-2.0) global ratings and summary scores.

	MISC-2 ratings (n = 32) Mean (SE)	Benchmark (Miller 2000)	% of sessions meeting benchmark
Global ratings			
Counselor acceptance	5.75 (1.30)	>5.0	77.5%
Counselor empathy	5.44 (1.13)	>5.0	72.5%
Counselor MI spirit	5.09 (1.05)	>5.0	80.0%
Client self-exploration	5.71 (1.07)	>5.0	79.5%
Summary Scores			
Ratio of reflections to questions	1.23 (0.46)	>1.0	64.1%
Percent open questions	38% (14%)	>50%	28.2%
Percent complex reflections	44% (18%)	>40%	59.0%
Percent MI-Consistent Responses	99% (2%)	>80%	100%

Table 4

MI Quality and Risky Sexual Behavior: Zero-Inflated Model Correlation Coefficients.

	Client ratings ^a			MISC–2.0 scores ^c		
	Parameter Estimate	Standard Error	P-value	Parameter Estimate ^b	Standard Error	P-value
Counselor empathy	–0.106	0.21	0.6054	–0.74	0.22	0.001
Counselor acceptance	1.01	0.42	0.0152	–0.60	0.12	< 0.001
Counselor MI spirit	–	–	–	–0.76	0.36	0.0002
Client self-exploration	0.83	0.32	0.0098	–0.40	0.12	0.0005
Client benefit	–0.53	0.15	0.0005	–	–	–
Session relevance	0.64	0.28	0.0210	–	–	–
Reflections/Questions	–	–	–	–2.29	0.45	<0.0001
Percent open questions	–	–	–	0.05	1.15	0.9620
Percent Complex Reflections	–	–	–	–3.51	1.90	0.641
Percent MI-Consistent Responses	–	–	–	2.94	4.5	0.5134

^a Controlling for covariates: gender, sex preference group, income, study site, and age.^b Parameter estimates indicate that for each unit change in the predictor variable, there is^c Controlling for covariates: sex preference group, study site.

and acceptance assessed via the MISC-2.0, the significant relationships we found between client ratings and risky sexual behavior may provide additional information about how acceptance and client disclosure operate in MI interactions. For instance, clients who struggled more with risky sexual behavior may be more aware of their counselor accepting them and more disclosing of personal information. Conversely, those with little condomless sex to disclose may not have noticed counselor acceptance as much, or had as much to disclose. Working with an accepting counselor may also decrease the influence of social desirability bias on clients with more risky behavior, who may be more willing than clients with less accepting counselors to report their true levels of risky behavior.

We also assessed client-rated measures that were not specific to MI, but rather related to how much the client perceived that they benefited from the counseling and how relevant or important the session content was to them. Both variables were associated with condomless sex, although in opposite directions from each other. Higher ratings of benefit, but lower ratings of relevance, were associated with lower levels of condomless sex. These results may suggest that clients who have greater difficulty managing sexual risk may perceive their safer sex sessions as more relevant, but may also have higher levels of risk than those who perceive sessions as less relevant. High perceived benefit ratings, on the other hand, may more accurately indicate that a session helped the participant reduce or avoid condomless sex, provided useful strategies for risk reduction, and/or resulted in actual improvements in behavior. Although these findings may seem to suggest that perceived benefit is the more important construct to measure, perceived relevance may be particularly important for the effects of MI among those with the greatest awareness of their sexual risk, who may need additional support for risk reduction.

We are not aware of any other research studies that have assessed client-rated aspects of MI quality. Our client ratings did not correlate highly with the MISC-2.0 ratings and had opposite relationships with study outcomes, suggesting that they should not be used in lieu of objective coding; however, the findings do suggest that client perceptions may be important in understanding the impact of MI on behavior and may differ substantially from those of trained raters. Further research is needed to understand how perceptions of counseling and behavior are related.

This study has several limitations. First, we only applied MISC-2.0 ratings to one coded session per randomly selected participant although most participants received a total of four sessions that may have varied in quality, and the newer version of the MISC coding system instrument (2.1) was not available for use at the time [29]. Furthermore, the MISC-2.0 study sample is small due to the time-intensive nature of the coding process. Other limitations

concern our study outcome, unprotected anal or vaginal intercourse with any partner (regardless of serostatus), which limits our ability to understand the relationship between MI quality and risk of HIV transmission to uninfected sex partners, as well as the role of safer sex options such as pre-exposure prophylaxis and “treatment as prevention” which emerged after our research was conducted. Finally, there was one large outlying sexual behavior count value that may have decreased the precision of the client-reported counseling exit survey multivariate analysis.

4.2. Conclusion

Our study contributes to the MI literature as the first to examine client-rated MI quality indicators and one of the first to examine MI quality in relation to sexual risk outcomes among people living with HIV. Further research is needed to determine the best methods of translating information about MI quality into dissemination of effective MI interventions with people living with HIV.

4.3. Practice implications

Our results support the importance of preserving fidelity in the delivery of SafeTalk and potentially other MI interventions with people living with HIV. Mechanisms to enhance fidelity that may be useful to preserve during dissemination included the use of Master's-level counselors, whose training may have supported their ability to achieve MI proficiency; the amount and content of MI counselor training; and the weekly individual and monthly group supervision sessions. An additional implication is the potential utility of assessing clients' ratings of the relevance and benefit of an MI session. Finally, additional methods of enhancing MI fidelity may further improve the effectiveness of SafeTalk. For example, some projects have implemented routine MI coding and feedback for counselors during the intervention to ensure and promote the use of MI-consistent behaviors. Each implication suggests potential strategies for enhancing an already effective HIV prevention intervention to achieve the greatest possible benefit for reduced HIV transmission.

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