Published in final edited form as:

Patient Educ Couns. 2013 October ; 93(1): 122–129. doi:10.1016/j.pec.2013.04.001.

Motivational interviewing by HIV care providers is associated with patient intentions to reduce unsafe sexual behavior

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Abstract

Objective—Motivational Interviewing (MI) can promote behavior change, but HIV care providers rarely have training in MI. Little is known about the use of MI-consistent behavior among untrained providers. This study examines the prevalence of such behaviors and their association with patient intentions to reduce high-risk sexual behavior.

Methods—Audio-recorded visits between HIV-infected patients and their healthcare providers were searched for counseling dialogue regarding sexual behavior. The association of providers' MI-consistence with patients' statements about behavior change was assessed.

Results—Of 417 total encounters, 27 met inclusion criteria. The odds of patient commitment to change were higher when providers used more reflections ($p=0.017$), used more MI consistent utterances ($p=0.044$), demonstrated more empathy ($p=0.049$), and spent more time discussing sexual behavior ($p=0.023$). Patients gave more statements in favor of change (change talk) when providers used more reflections ($p<0.001$) and more empathy ($p<0.001$), even after adjusting for length of relevant dialogue.

Conclusion—Untrained HIV providers do not consistently use MI techniques when counseling patients about sexual risk reduction. However, when they do, their patients are more likely to express intentions to reduce sexual risk behavior.

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Meetings: Preliminary results were presented as abstracts at the Society of General Internal Medicine Mid-Atlantic Regional Meeting, March 2012, Newark, Delaware; and at the Society of General Internal Medicine Annual Meeting, May 2012, Orlando, Florida.

None of the authors have any relevant financial conflicts of interest.

Practice Implications—MI holds promise as one strategy to reduce transmission of HIV and other sexually-transmitted infections.

Keywords

Motivational Interviewing; Physicians; HIV/AIDS; Sexual risk reduction; Counseling

1. Introduction

Motivational interviewing (MI) is a client-centered, directive counseling style that has been used successfully to promote behavior change by exploring ambivalence and eliciting the client's own motivation to change [1]. The evidence for MI's effectiveness is strongest in the realm of addictive behaviors [2–5]. More recently, MI techniques have been applied to other behaviors beyond substance abuse, such as diet [6], weight loss [7], palliative care decisions [8], chronic illness management [9] and screening behaviors [10]. So far, few studies have looked at sexual behavior. SafeTalk, a MI-based intervention for People Living with HIV/AIDS (PLWHA) to promote safer sex, has demonstrated reductions in unprotected sex acts with at-risk partners [11–13].

MI is proposed to work by evoking and strengthening the patient's own arguments in favor of change. If the patients, rather than their practitioners, articulate the motivation to change, they may be more likely to follow through on modifying their behavior. In addition, practitioners using MI are trained to respond to client's resistance to change in an empathic, nonjudgmental manner [14]. Empirical studies have supported this conceptual framework. Patient expressions of intention to change during counseling encounters are associated with improved outcomes, such as reductions in substance abuse [15,16]. MI-consistent behaviors used by practitioners elicit more patient expressions in favor of change (change talk) while MI-inconsistent behaviors favor patient intention to continue unhealthy behaviors (counter-change or sustain talk) [16–20]. An emerging theory of MI mechanisms of action has proposed a causal chain between practitioner speech, patient speech, and subsequent patient behavior change [14,21].

Most studies of MI, including the SafeTalk intervention, have examined MI delivery by trained counselors or psychologists. There is growing interest in adapting MI to the clinical setting for use by physicians [6,7]. HIV care providers are concerned about patients' risky sexual behaviors but may be unsure how to incorporate counseling into clinic visits [22,23]. MI consists of both techniques to employ, and techniques to avoid, and little is known about the rates at which physicians not trained in MI use MI-consistent and MI-inconsistent techniques in their sexual risk reduction behavior change counseling. This study therefore addresses the following questions: 1) To what extent do HIV providers use MI-consistent techniques when counseling patients about sexual risk reduction? (2) When HIV providers do use MI-consistent techniques, are they associated with (a) patient expressions of commitment to safer sex practices, or (b) higher change talk from patients regarding sexual risk behavior?

2. Methods

2.1. Study Participants

We analyzed data gathered by the Enhancing Communication and HIV Outcomes (ECHO) study [24–28], a cross-sectional observational study of patient-provider communication. Recruitment for the ECHO study is described in detail elsewhere [24]. Briefly, the setting was four urban, academic, outpatient clinic sites in Baltimore, Maryland; New York, New York; Detroit, Michigan; and Portland, Oregon. IRB approval was obtained at each study

site. Patients were 19 years or older, English-speaking, living with HIV, and had had at least one prior visit with their provider. Providers were physicians, physician assistants, and nurse practitioners delivering care to patients at the study sites.

2.2. Data Collection

With patient and provider consent, routine follow-up visits were audio-recorded, transcribed, and searched for dialogue relevant to sexual behavior. The current study included only dialogue in which the patient reported unsafe sexual behavior and received counseling by the provider. Of the 417 encounters available in the data set, 27 met these inclusion criteria.

2.3. Coding of audio recordings

Segments of dialogue relevant to sexual behavior in the 27 included encounters were coded using two previously established systems for analyzing MI-based counseling. Coding was performed by two independent raters trained in the use of these methods (TF and MM) with inter-rater agreement (kappa) of 0.75. Coding was also checked by a third rater, a clinical psychologist and MI trainer (GR), and disagreements resolved through consensus.

Patient speech was coded using the Client Language Assessment in Motivational Interviewing (CLAMI) [29]. The CLAMI assigned patient utterances to the following mutually exclusive categories: commitment to change, reasons to change (including desire, need, or ability to change), taking steps toward change, and other statements regarding change. These utterances were either positive or negative (for example, reasons in favor of change or reasons against change). The investigators added a code for patient questions about sexual behavior, because we believed that these questions suggested patient engagement in considering change.

Provider speech was coded using the Motivational Interviewing Treatment Integrity (MITI), originally developed to evaluate trained counselors' adherence to MI principles [30]. The MITI has two components: behavior counts and global scores. The behavior counts capture the technical elements of MI, while the global scores assess an overall impression of the relational aspect of MI. To code behavior counts, provider utterances were assigned to the following mutually exclusive categories: MI-adherent (advising with permission, affirming the patient, emphasizing the patient's control, or supporting the patient); MI-nonadherent (advising without permission, confronting the patient, or directing the patient); reflections (simple or complex); questions (open or closed); and giving information. A summary score of MI balance was calculated using MI-consistent talk (reflections and MI-adherent behaviors) minus MI-nonadherent behaviors.

To assess global scores, coders rated each dialogue in the following dimensions: Evocation (the extent to which providers elicited the patients' own motivations for change); Collaboration (the extent to which providers worked with patients as equal partners); Autonomy/Support (the extent to which providers supported and actively fostered patients' sense of choice and control); and Empathy (the extent to which providers understood patients' perspectives). Each dimension was scored on a scale from 1 (low) to 5 (high). Consistent with the MITI, a summary score of MI Spirit was calculated using the mean of scores on Evocation, Collaboration, and Autonomy/Support.

When used to evaluate psychologists or mental health counselors, the MITI assigns global scores to random 20-minute segments within counseling sessions [30]. Such segments were not available in this study. Only portions of dialogue relevant to sexual behavior were included, which varied in length and occurred within the context of medical clinic visits. This adaptation of the MITI, applied only to sexual behavior counseling, is consistent with

methods used in other studies of physician adherence to MI principles in weight loss counseling [7].

2.4. Independent variables

Independent variables in our analysis were provider behavior counts in the following categories: MI-adherent, MI-nonadherent, reflections, asking questions, giving information; the summary score of MI balance; and providers' global scores of empathy and MI spirit. Length of relevant dialogue was also derived from the audio-recordings.

2.5. Outcome measures

Two outcomes measures were used in our analysis: patient commitment to change and total change talk from the patient. Change talk consisted of all positive patient utterances in the following categories: commitment to change, reasons to change, taking steps toward change, and other statements in favor of change. Change talk excluded patient questions about sexual behavior and negative patient utterances in favor of sustaining high-risk behavior.

2.6. Statistical analyses

We performed t-tests and chi-squared tests to assess for differences between the 27 encounters included in the analysis and the total 417 encounters on patient age, gender, and race; provider age, gender, and race; patient-provider concordance on age, gender, and race; and total time of the encounter; and length of patient-provider relationship (longer or shorter than 5 years). Patients and providers were considered concordant on age if within 10 years, concordant on gender if male-male or female-female pairs, and concordant on race if white-white or nonwhite-nonwhite pairs.

To address the question of the extent to which HIV providers used a MI-consistent communication style, we performed a descriptive analysis of provider speech. For each category of provider speech, we calculated mean behavior counts, number and percentage of dialogues with any examples of the behavior, and total number of utterances of each type in the dialogues.

To address the question of whether HIV providers' use of MI-consistent communication style was associated with patient speech, we used two outcomes. First, patient commitment to change was examined as a dichotomous outcome, due to the low number of dialogues with more than one occurrence of commitment speech. Second, patients' mean change talk was examined as a continuous outcome.

We used t-tests to compare mean provider behavior counts and global scores in dialogues with versus without patient commitment to change. We used separate logistic regression analyses to investigate associations between patient commitment to change with each of the independent variables of provider behaviors. Adjustments for dialogue length were made for each logistic regression model. Provider variables were not all included in one model together, because they were correlated. We also performed logistic regressions to investigate associations between patient commitment to change and patient and provider demographics variables.

We used linear regression analysis to investigate associations between patient change talk and each of the independent variables of provider behaviors in unadjusted models and then adjusting for dialogue length. We also performed linear regressions to investigate associations between patient change talk and patient and provider demographics variables. The sample size was too small to allow meaningful adjustment for patient or provider

demographics. All statistical analyses were performed using STATA 11 (College Station, TX: StataCorp).

3. Results

3.1 Patient and provider characteristics

Table 1 shows characteristics of the 27 patients and 16 providers whose encounters met inclusion criteria, out of the total 417 patients and 45 providers. Included patients were younger than those not included (mean age 41.3 vs. 45.7 years, $p=0.02$) and included providers were older than those not included (mean age 47.5 vs. 44.3 years, $p=0.05$). Included patients and providers were more likely to have longer relationships (5 years or more) than those not included (52% versus 33%, $p=0.04$). No significant differences were found for patient gender or race; provider gender or race; patient-provider concordance on age, gender, or race; or total time of the encounter.

3.2 Provider behavior counts

Provider behaviors, with examples from the dialogues, are shown in Table 2. In 56% of dialogues, providers used reflections. In 48% of dialogues, providers used MI-adherent statements. The most common were affirming the patient (41%), followed by emphasizing the patient's control (19%), and supporting the patient (7%). These MI-adherent statements were given by 10 (63%) of the 16 providers.

In 59% of dialogues, providers used MI-nonadherent statements. The most common were advising without permission (52%), followed by directing the patient (37%) and confronting the patient (26%). Providers used more MI-nonadherent than MI-adherent behaviors (43 versus 28 utterances in all dialogues). The most common provider behaviors were giving information (78% of dialogues) and asking questions (93% of dialogues), the majority of which were closed questions (97 out of 120 questions).

In the total 417 encounters, 45 providers participated with a mean of 10 dialogues per provider (range 1–16). Most dialogues for each provider did not meet inclusion criteria, even for providers included more than once. For the 16 included providers, only 18% (range 8–33%) of their dialogues were included. Patterns of provider style were captured by the summary score of MI balance. Overall, MI balance was 1.1 (range –4 to 10), indicating that providers used a mix of MI-consistent and MI-inconsistent behaviors. For individual providers represented more than once, a range of MI balance was also seen (for example, –3 to 8).

3.3 Patient behavior counts

Patient behaviors, with examples from the dialogues, are shown in Table 3. Patient expressions of commitment to change occurred in 30% of the dialogues. In 78% of the dialogues, patients made positive statements in favor of change, of which the most common were reasons for change (56%) and taking steps toward change (48%). In 44% of the dialogues, patients made negative statements against change, of which the most common were reasons against change (30%) and taking steps away from change (22%). In 26% of dialogues, patients asked questions about the target behavior.

The dialogues contained 97 positive utterances in favor of change, 22 negative utterances, and 15 patient questions about the target behavior. For positive utterances (change talk), the mean was 3.59 utterances per dialogue (standard deviation 3.99). For most dialogues, the amount of change talk fell within 2 standard deviations of the mean, except for 1 outlier which contained 17 utterances.

3.4 Provider behaviors associated with patient commitment to change

Table 4 shows the results of t-tests investigating provider behaviors in dialogues with versus without patient commitment to change. In dialogues with patient commitment, providers used significantly more MI-adherent statements and reflections, had higher MI balance, asked more questions, and demonstrated more empathy and MI spirit. Although providers appeared to use more MI-nonadherent statements and information-giving as well, these were non-significant. Dialogues with patient commitment to change contained longer segments relevant to sexual behavior, but did not differ in total length of the clinic visit.

The results of the logistic regression analysis are shown in Table 5. The odds of patient commitment to change were significantly higher when providers used more reflections (OR 1.89, 95% CI: 1.12–3.18), had higher MI balance (OR 1.31, 1.01–1.71), asked more questions (OR 1.41, 1.03–1.94), showed more empathy (OR 6.05, 1.01–36.23) and more MI spirit (OR 6.63, 1.23–35.72), and spent more time discussing sexual behavior (OR 1.55, 1.06–2.27). After adjusting for length of dialogue relevant to sexual behavior, the associations between other provider behaviors and patient commitment to change were no longer statistically significant. No significant associations were seen between patient commitment to change and any patient or provider demographics variables.

3.5 Provider behaviors associated with patient change talk

The results of the linear regression analysis are shown in Table 6. Patients had higher mean change talk when providers used more MI-adherent statements, reflections, MI balance, asking questions, and giving information; showed more empathy and MI spirit; and spent more time discussing sexual behavior. For example, patients had 1.64 more utterances of change talk per dialogue for each increase of 1 MI-adherent utterance by providers (95% CI: 0.90–2.39). After adjusting for length of relevant dialogue, only reflections ($p=0.005$) and empathy ($p=0.030$) remained statistically significant. Trends toward higher mean change talk were seen for MI-adherent statements ($p=0.057$), MI balance ($p=0.053$), and MI spirit ($p=0.093$). No significant associations were seen between patient change talk and any patient or provider demographics variables.

Sensitivity analyses revealed that the models fit assumptions of normality well (using Shapiro-Wilk tests). Redoing the linear regressions for the outcome of change talk with the outlier dialogue excluded and performing robust regressions with down-weighting of influential points did not show a substantive change in the results. It is therefore unlikely that outliers of patient behavior heavily influenced the data. In addition, adjustment for clustering by provider had no significant impact on results. Although some providers were represented more than once, it does not appear that they had undue leverage. The analysis was also repeated using mean target behavior talk (positive and negative utterances and questions about target behavior) as a continuous outcome and showed the same patterns described above for change talk.

4. Discussion and Conclusion

4.1. Discussion

This study identified two main findings. First, MI-naïve providers' communication behaviors when counseling patients with HIV about risky sexual behavior are more often MI non-adherent than adherent. Second, when providers do use more MI-consistent communication styles, their patients are more likely to express commitment to change sexual behavior. Their patients are also more likely to have a greater amount of change talk. This is the first study to analyze the use of MI-consistent communication styles by HIV care

providers in routine clinical practice and associations between patient and provider communication behaviors regarding safer sex.

Our finding that physicians not specifically trained in MI do not use these techniques often or well is not surprising, and is consistent with prior observational studies of untrained providers [7,31]. What is more surprising, and has not been previously demonstrated, is that MI adherent provider behaviors that occur in the course of routine clinical interactions among nontrained physicians are positively associated with patient change talk. The demonstration of this relationship in an observational study has two important implications. First, it provides additional support (construct validity) for the conceptual underpinnings of MI, since the hypothesized relationships could be demonstrated in a non-experimental setting. Second, it suggests that helping physicians to do MI more effectively may be more a matter of sharpening and redirecting physicians' existing clinical instincts than a process of complete reeducation or retraining. This study offers evidence that MI can be used by HIV care providers to elicit patient commitment and change talk regarding sexual risk reduction.

Some caveats are important to keep in mind in interpreting these findings. The associations between patient change talk and MI-consistent provider behaviors may be explained by length of relevant dialogue. Though not statistically significant, even MI-nonadherent statements were higher in dialogues with patient commitment, which tended to be longer and contain more provider statements in general. Also, patient commitment was more likely when providers asked more questions (most of which were closed) or gave more information, which are considered neutral behaviors in MI Balance. It may be that the time spent discussing sexual behavior is more important than the particular counseling techniques used. Alternatively, time may be considered an intermediate variable that is part of MI delivery and thus should not be adjusted for. Dialogues tend to be longer when providers use more reflections [32] and longer MI time has been associated with improved patient behavior outcomes [13]. However, in multiple encounters of similar length, individual providers used more MI-adherence with some patients than with others. MI-adherent behaviors appeared to depend on the patient-provider pair, rather than the provider alone. Therefore, it is unlikely that a particular provider would necessarily increase MI-adherent talk simply by having more time. In addition, the type of provider talk remained significantly associated with patient change talk, even after adjustment for length of relevant dialogue. This suggests that it is the type of provider talk which plays a role in increasing patient change talk, rather than the amount of talk alone.

Another issue is the sequence of patient and provider speech. MI-consistent provider behaviors lead to change talk, but change talk from the patient may also elicit MI-consistent behavior from the provider [19]. Frequencies of patient and provider behaviors do not delve into the potentially reciprocal nature of counseling dialogue. The patient's initial predisposition toward change may play a role in directing the provider's speech. The 27 encounters included in this study represent a minority of patient-provider pairs, those who engaged in counseling dialogue regarding sexual risk behavior. In most of the 417 encounters in the total data set, sexual behavior was not discussed at all or no advice about risk reduction was given, consistent with prior studies demonstrating the infrequency of talking about sex in clinic visits, even in HIV care [33–35]. Compared to the total data set, the 27 encounters in this study included younger patients and older providers with longer patient-provider relationships, but no other significant differences were seen on patient gender or race, provider gender or race, or patient-provider concordance on age, gender, or race. The outcomes of patient commitment to change and patient change talk were not significantly associated with any patient or provider demographics. Therefore, it is unlikely that any salient demographics differences account for the relationships seen between provider behaviors and patient behaviors. The pairs in this study may include patients who

were exceptionally inclined towards discussing safer sex, due to personal readiness to change or circumstances increasing the salience of change (such as STI diagnosis). In addition, the providers may have been exceptionally comfortable talking about sex or had already formed trusting, non-judgmental relationships with these patients that allowed such conversations to take place.

There is no consensus regarding the most meaningful variable for patient (or client) speech. Some studies have found that commitment to change is the only type of patient speech associated with improved outcomes [36]. Others have found that patient statements of reasons for change [37,38] or ability to change [39] are significant, while commitment is not. Others examine the sum of all change talk, which includes commitment, reasons, ability, need, desire, taking steps towards change, and other statements in favor of change [40,41].

The ideal method for analysis of practitioner speech is also a matter of debate [42]. Many prior studies assessing fidelity of MI delivery [15,19,41,43] have used versions of the Motivational Interviewing Skills Code (MISC). The Motivational Interviewing Treatment Integrity (MITI) method was developed to reduce the complexity of the MISC, while retaining reliability, validity, and sensitivity [44]. The MITI was designed for random 20-minute segments of dialogue from counseling sessions, which are rarely available in clinic visits with physicians. In medical settings, the MITI has been used to evaluate the quality of physicians' counseling in shorter segments of dialogue focused on particular target behaviors [6,7].

In using MITI/CLAMI coding, we found the system to be practical and achieved good reliability. However, some questions arose which may have implications for adaptations of this coding method. In exploring patient commitment to change, we suspected that not all commitment statements were equal in meaning, though they were coded the same. Some statements sounded weak or unconvincing in tone, while others more clearly demonstrated patients' intention to change. The MITI system lacks commitment strength ratings, unlike the MISC system. In coding reflections, we could not differentiate between providers' accurate reframing of the patient's viewpoint and providers' inaccurate assumptions of the patient's meaning. In addition, providers gave long sequences of biomedical facts about HIV transmission, which were not parsed by patient facilitating statements. A single "giving information" code for a paragraph of provider speech may not fully convey the patients' burden of information overload.

Conceptual issues also arise in adapting MI to physician use, which go beyond the refinement of coding schemes. Models of ideal doctor-patient communication have changed over time to emphasize more patient-centered approaches [45–47] and are being increasingly incorporated into medical education [48,49]. Many healthcare providers in our study were older (average age 48 years) and likely had little exposure to communication skills curricula. They may have been trained to ask closed questions, give unsolicited advice, and adopt an authoritative rather than collaborative stance towards patients, which are all behaviors discouraged by MI. Recent evidence that the use of MI-consistent communication styles by physicians is associated with healthy behavior change in their patients has supported efforts to incorporate MI training into current medical curricula [50,51]. One challenge in MI training for physicians and other healthcare providers will be the appropriate transfer of MI techniques to the unique dynamics of the patient-provider relationship and the time-pressured context of clinical encounters.

This study has a few limitations to consider. (i) A small sample size decreased the power to detect subtle differences or to fully adjust for potential confounders. (ii) Only one encounter

was recorded for each patient-provider pair, restricting our view to one time-point of a counseling process which may evolve over several encounters. (iii) Whether patients followed through on their expressed intention to change sexual risk behavior was unknown. Despite these limitations, this study offers new insight into HIV providers' use of MI-consistent communication styles in counseling patients about sexual behavior and suggests directions for future research in this area.

4.2. Conclusion

In summary, HIV providers do not commonly use MI techniques when counseling patients about sexual risk reduction. However, when HIV providers do use MI techniques, their patients are more likely to express commitment to safer sex practices and to use more change talk regarding sexual risk behavior. Next steps could include larger studies taking length of relevant dialogue into account, training interventions for providers in MI use, longitudinal assessment of patient-provider encounters, and follow-up of patients' behaviors or clinical outcomes.

4.3. Practice Implications

To the extent that patient intentions to change do in fact result in less risky behavior, MI holds promise as one strategy to reduce transmission of HIV and other sexually-transmitted infections. More work is needed to determine the optimal counseling methods for providers to help patients reduce high-risk behaviors. In addition, the training of providers to deliver effective counseling merits further study.

Acknowledgments

This research was supported by a contract from the Health Resources Service Administration and the Agency for Healthcare Research and Quality (AHRQ 290-01-0012). In addition, Dr. Flickinger was supported by the National Institutes of Health (5 T32 HL007180-35), Dr. Berry was supported by the National Institute of Allergy and Infectious Disease (K23 AI084854), Dr. Korthuis was supported by the National Institute of Drug Abuse (K23 DA019809), Dr. Saha was supported by the Department of Veterans Affairs, Dr. Beach was supported by the Agency for Healthcare Research and Quality (K08 HS013903-05) and both Drs. Beach and Saha were supported by Robert Wood Johnson Generalist Physician Faculty Scholars Awards. Dr. Wilson was supported by a K24 from NIMH (2K24MH092242). None of the funders had a role in the design and conduct of this analysis, nor was it subject to their final approval.

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Table 1

Patient and provider characteristics.

	Patients n=27	Providers n=16
Age in years, mean (SD)	41.3 (8.5)	47.5 (6.6)
Sex	41% Female	44% Female
	59% Male	56% Male
Race	19% White	85% White
	59% Black	7% Black/Latino
	19% Latino	7% Asian
	4% Other	

Table 2

Provider behavior counts in counseling dialogue regarding patient's sexual behavior

Provider behavior	Example from dialogue	Mean (SD)	Dialogues with any (%)	Total utterances in all dialogues
<u>Reflections (Total)</u>		1.63 (2.17)	15 (56)	45
Simple reflections	"You didn't use one."	0.44 (0.85)	7 (26)	13
Complex reflections	"So that's the motivating factor."	1.19 (1.78)	13 (48)	32
<u>MI Adherent (Total)</u>		1.04 (1.63)	13 (48)	28
Asking permission before giving advice or information	None.	0	0	0
Affirming the patient by saying something positive	"Good job! You met your goal."	0.67 (1.00)	11 (41)	18
Emphasizing the patient's control	"So, you're the one who would say yes or no."	0.30 (0.72)	5 (19)	8
Supporting the patient with compassion or sympathy	"You know we're here for you."	0.07 (0.27)	2 (7)	2
<u>MI Non-Adherent (Total)</u>		1.59 (1.65)	16 (59)	43
Advising without permission	"If you're gonna have sex with him, just use a condom."	0.70 (0.82)	14 (52)	19
Directing the patient by giving orders or commands	"Don't give it to anybody. Don't get any more [STIs]."	0.52 (0.80)	10 (37)	14
Confronting the patient with disapproval or negativity	"It's not okay for you to have sex without a condom."	0.37 (0.74)	7 (26)	10
<u>Questions (Total)</u>		4.44 (3.30)	25 (93)	120
Open questions	"Why is it a little bit important to you?"	0.85 (1.49)	12 (44)	23
Closed questions	"Do you always use protection?"	3.59 (2.39)	25 (93)	97
<u>Gives Information</u>	The higher the viral load, the more likely the risk for infection."	2.85 (3.56)	21 (78)	77

Table 3

Patient behavior counts in counseling dialogue regarding patient's sexual behavior

Patient behavior	Example from dialogue	Mean (SD)	Dialogues with any (%)	Total utterances in all dialogues
<u>Positive utterances</u>		3.63 (4.02)	21 (78)	97
Commitment to change	"It's gotta be safe, no matter what."	0.59 (1.25)	8 (30)	17
Reason for change	"I wouldn't want to infect someone knowingly."	1.55 (1.95)	15 (56)	22
Taking steps toward change	"I picked up condoms from clinic."	1.04 (1.58)	13 (48)	28
Other positive statement to change	"I'm seriously gonna consider what you said."	0.44 (0.70)	10 (37)	12
<u>Negative utterances</u>		0.81 (1.14)	12 (44)	22
Commitment against change	None.	0	0	0
Reason against change	"He likes it bareback."	0.52 (0.89)	8 (30)	14
Taking steps away from change	"I hadn't disclosed to him."	0.26 (0.53)	6 (22)	7
Other negative statement against change	"If I have relations with one person, I may have not used a condom."	0.04 (0.19)	1 (4)	1
<u>Questions about target behavior</u>	"Isn't it unsafe to have Unprotected oral sex?"	0.56 (1.22)	7 (26)	15

Table 4

Provider behaviors in dialogues with versus without patient commitment to change using t-tests

	<u>With commitment</u> N=8	<u>Without commitment</u> N=19	<u>All dialogues</u> N=27	
Provider behavior	Mean	Mean	Mean	p-value
<u>Utterance counts</u>				
MI adherent	2.13	0.58	1.04	0.021
Total reflections	3.50	0.89	1.67	0.002
MI non-adherent	2.13	1.37	1.59	0.284
MI balance	0.00	−0.79	−0.56	0.026
Total questions	6.75	3.47	4.44	0.015
Giving information	4.63	2.11	2.85	0.093
<u>Global scores</u>				
Empathy	3.75	2.95	3.19	0.007
MI spirit	3.83	2.93	3.20	0.005
<u>Timing</u>				
Time of total dialogue in minutes	28.35	27.91	28.04	0.931
Length of dialogue relevant to sexual behavior in minutes	5.82	2.21	3.28	0.004

Table 5

The odds of patient commitment with higher mean provider behaviors using unadjusted logistic regression and multivariate logistic regression adjusted for length of relevant dialogue

Provider behavior	<u>Unadjusted</u>		<u>Adjusted for length</u>	
	Odds Ratio (95% CI)	p-value	Odds Ratio (95% CI)	p-value
<u>Utterance counts</u>				
MI adherent	1.98 (0.96–4.08)	0.063	1.57 (0.68–3.62)	0.293
Total reflections	1.89 (1.12–3.18)	0.017	1.54 (0.84–2.87)	0.164
MI non-adherent	1.33 (0.80–2.23)	0.276	1.20 (0.67–2.17)	0.539
MI balance	1.31 (1.01–1.71)	0.044	1.15 (0.84–.56)	0.387
Total questions	1.41 (1.03–1.94)	0.033	1.26 (0.90–1.77)	0.179
Giving information	1.22 (0.95–1.56)	0.122	0.84 (0.55–1.28)	0.411
<u>Global scores</u>				
Empathy	6.05 (1.01–36.23)	0.049	2.85 (0.41–19.69)	0.288
MI spirit	6.63 (1.23–35.72)	0.028	2.94 (0.36–23.94)	0.313
<u>Timing</u>				
Length of dialogue relevant to sexual behavior in minutes	1.55 (1.06–2.27)	0.023		

Table 6

Increase in mean patient change talk with higher mean provider behaviors using unadjusted linear regression and multiple linear regression adjusted for length of relevant dialogue

Provider behaviors	<u>Unadjusted</u>		<u>Adjusted for length</u>	
	Change talk (95% CI)	p-value	Change talk (95% CI)	p-value
<u>Utterance counts</u>				
MI adherent	1.64 (0.90–2.39)	<0.001	0.77 (–0.03–1.57)	0.057
Total reflections	1.44 (0.96–1.91)	<0.001	0.89 (0.29–1.48)	0.005
MI non-adherent	0.55 (–0.43–1.52)	0.259	0.17 (–0.50–0.84)	0.607
MI balance	0.71 (0.37–1.05)	<0.001	0.33 (–0.01–0.67)	0.053
Total questions	0.51 (0.06–0.96)	0.028	0.16 (–0.20–0.51)	0.373
Giving information	0.58 (0.19–0.98)	0.006	–0.24 (–0.72–0.24)	0.313
<u>Global scores</u>				
Empathy	3.91 (2.36–5.46)	<0.001	2.04 (0.22–3.85)	0.030
MI spirit	3.60 (2.18–5.02)	<0.001	1.67 (–0.30–3.64)	0.093
<u>Timing</u>				
Length of dialogue relevant to sexual behavior in minutes	0.98 (0.64–1.32)	<0.001		