Tailored Motivational Interviewing (TMI): Translating Basic Science in Skills Acquisition into a Behavioral Intervention to Improve Community Health Worker Motivational Interviewing Competence for Youth Living with HIV

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Abstract

Objective: Interventions to promote evidence-based practices are particularly needed for paraprofessional staff working with minority youth with HIV who have higher rates of HIV infection but lower rates of linkage and retention in care compared to older adults. Utilizing the ORBIT model for behavioral intervention development, we defined and refined a behavioral intervention for providers, Tailored Motivational Interviewing (TMI), to improve provider competence in previous studies (Phase 1a and 1b). The current study focuses on ORBIT Phase 2a – proof of concept. We hypothesized that TMI would be acceptable and feasible and would show a signal of efficacy of improving and maintaining community health worker (CHW) MI competence scores using an innovative statistical method for small N proof-of-concept studies.

Method: Longitudinal data were collected from 19 CHWs at 16 youth HIV agencies. CHWs from 8 sites were assigned to the TMI group per the co-funders request. The remaining 8 sites were randomly assigned to TMI or services as usual. MI competence was assessed at baseline and up to 15 times over two years. Random coefficient models were utilized to examine time trajectories of competence scores and the impact of the intervention on competence trajectories. Semi-structured interviews were conducted to determine barriers and facilitators of TMI.

Results: Competence scores in the TMI group significantly increased while the scores of the control group significantly decreased. Further analysis of the intervention group demonstrated that scores significantly increased during the first three months after initial workshop and was sustained through the end of the study. Qualitative findings revealed insufficient time and competing priorities as perceived barriers whereas integrating MI into routine agency practices and ongoing training might facilitate implementation.

Conclusions: Following a successful proof-of-concept, the next step is a fully randomized pilot study of TMI relative to a control condition in preparation for a stepped-wedge cluster randomized full scale trial.

Tailored Motivational Interviewing (TMI): Translating Basic Science in Skills Acquisition into a Behavioral Intervention to Improve Community Health Worker Motivational Interviewing Competence for Youth Living with HIV

The last decade has seen significant investment in implementation science to end the HIV epidemic (Centers for Disease Control, 2012) to increase the translation of intervention research to practice. Fidelity of implementation refers to adherence to the intervention implementation plan as well as competency in intervention program delivery (Cross & West, 2011). As community health workers (CHW) are increasingly utilized to deliver evidence-based behavioral treatments to improve health, behavioral interventions to improve CHW competence are critical to the delivery of these treatments with fidelity and to increase effectiveness in real world settings (Allen, Escoffery, Satsangi & Brownstein,). Interventions to promote evidence based practices are particularly needed when working with minority youth (i.e., adolescents and emerging adults) living with HIV (YLH) who have disproportionally higher rates of HIV infection but lower rates of linkage and retention in care compared to older adults (Hall et al., 2013; Moore, 2011). Failure to link to care and subsequently maintain care means that the full public health benefits of early initiation of antiretroviral treatment to achieve viral suppression,

both for the individual health of the youth and to reduce transmission risk, are unrealized (Ulett et al., 2009). Paraprofessionals with more skills in youth-centered training are more likely to promote engagement in care with YLH (Philbin et al., 2014). While implementation science addresses implementation strategies to translate research to practice, behavioral intervention development focused on changing behaviors of *providers*, and CHWs in particular, to improve competence, are sorely needed.

Motivational Interviewing to Promote Youth Engagement in Care

Motivational interviewing (MI) is a highly specified framework for improving patient-provider communication and promoting behavior change (Rollnick, Miller, & Butler, 2008) through client-centered and goal-oriented directive methods for enhancing intrinsic motivation and self-efficacy (Miller & Rollnick, 2012). MI has been specifically adapted for youth (Naar-King & Suarez, 2011). Importantly, MI interventions can target multiple behaviors and be delivered by paraprofessionals, with effect sizes even stronger in minority populations (Lundahl et al., 2010; Naar-King, Outlaw, Green-Jones, Wright, & Parsons, 2009). MI is the only behavioral intervention shown to be effective for improved self-management for YLH (Mbuagbaw, Ye, & Thabane, 2012). Moreover, MI is the only successful intervention across several different HIV-related behaviors including promoting knowledge of HIV status, retention in care, viral suppression, condom use and substance use (Murphy, Chen, Naar-King, & Parsons, 2012; Naar-King, Outlaw, et al., 2009; Naar-King, Parsons, et al., 2009; Outlaw et al., 2010).

However, several studies suggest that MI competence is difficult for many providers (MacDonell et al., in press), and that a lecture or workshop alone is insufficient for competence (Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Mitcheson, Bhavsar, & McCambridge, 2009; Moyers et al., 2008; Moyers, Martin, Houck, Christopher, & Tonigan, 2009).

Implementation of evidence-based practices without monitoring competence and providing coaching support may be associated with staff stress if the new practice is viewed as an additional demand, where lack of ongoing support following training leads to reduced perceived mastery and self-efficacy (Miller & Rollnick, 2002). Thus, the development and testing of carefully translated behavioral interventions for providers to develop and sustain MI competence are warranted. Basic science studies related to skills acquisition may be translated into new provider interventions to improve such competence.

Rigorous Translation to Develop More Potent Behavioral Interventions

The National Institutes of Health Obesity-Related Behavioral Intervention Trials (ORBIT) model for behavioral intervention development (Czajkowski et al., 2015; Naar, Czajkowski, & Spring, 2018; Naar & Spring, 2018) provides a useful framework for designing and preliminary testing interventions (T1 translation) prior to full-scale clinical trials to increase rigor and replicability. Phase 1a (Define) tasks include identifying the basic behavioral and social science studies that form the foundation of what is translated into potential intervention components and specifying clinically significant milestones. This phase may also include identifying intervention components from the literature that could be adapted for the new intervention. The goal of Phase 1b (Refine) is to balance efficiency with potential efficacy. Refining includes the identification of essential components and removing components that seem to achieve little impact. Small studies of implementation (e.g., mode and agent of delivery, frequency and duration of contacts) may help understand factors that promote feasibility and fidelity (e.g., user-centered qualitative interviews, fidelity measurement and procedures). Refinement for specific subpopulations can also occur during this phase. The resulting

intervention is now ready for preliminary testing (Phase 2) in proof of concept studies (Phase 2a), feasibility pilots (Phase 2b), and small efficacy trials (Phase 2c).

Prior Work to Define and Refine the CHW Intervention

We first defined Tailored Motivational Interviewing (ORBIT Phase 1a), a provider intervention skills acquisition intervention, in the context of a clinical trial of an MI-based intervention to improve health outcomes and reduce risk among youth living with HIV in Adolescent Trials Network Protocol 004 (Naar-King, Parsons, et al., 2009). We utilized basic science findings in behavior modification and behavioral skills training as well as research in education on cooperative learning environments. Cooperative learning is a well-developed system for teaching students in small group settings, using highly specified instructional strategies to encourage students to work together in teams towards a common goal while helping each other learn (Kocak, 2008; Millis & Cottell Jr, 1997). Cooperative learning has three main ideas that are translated into instructional activities: (a) the enhancement of individual student learning and retention through group work, (b) the development of positive attitudes toward subject matter and toward learning, and (c) the development of interpersonal and problem-solving skills. Studies have demonstrated improved learning, enjoyment, and motivation in ethnic minority populations (Barkley, Cross, & Major, 2014; Johnson, Johnson, & Smith, 1998).

Bandura (2004) suggests additional strategies to promote self-efficacy for behavioral skills using role-play practice. These strategies, further specified by Miltenberger (2008) include modeling, rehearsal (verbal/behavioral), and feedback. We translated these findings into the TMI provider intervention that included a two-day MI skills training workshop structured with cooperative learning activities and carefully constructed role play practice (i.e., modeling, verbal and behavioral rehearsal and feedback). The workshop was followed by monthly individual coaching

consisting of rehearsal and feedback to ensure at least "beginner" competence (out of three categories – Below, Beginner, and Solid) on the Motivational Interviewing Treatment Integrity Codes (Moyers, Rowell, Manuel, Ernst, & Houck, 2016), with an increase in coaching frequency if competence scores fell below this level. These MITI scores have been associated with positive health outcomes in previous studies (e.g., McCambridge, Day, Thomas & Strang, 2011; Pollack et al., 2014; Woodin, Sotskova & O'Leary, 2012).

Thus, at least beginner competency was defined as the clinically significant target per the ORBIT model. Providers in this study were a mix of Masters level clinicians, graduate students, and individuals trained in HIV counseling and testing.

We subsequently refined TMI in subsequent studies in several ways (ORBIT Phase 1b). First, in order to target CHWs who may not have the level of counseling skills of providers in the previous study, and because MI training content was originally developed for providers working with adult substance using, mostly Caucasian patients, we sought to further refine the intervention by honing in on those core skills that were most likely to lead to increased motivation for improving health behaviors in youth. Using basic communication science methods, we sequentially analyzed those provider utterances most likely to lead to motivational language in ethnic minority youth (Idalski Carcone et al., 2013; Idalski Carcone, Naar, Clark, MacDonell, & Zhang, in press). We reorganized the training to focus more exclusively on these behaviors including autonomy supportive statements and selective reflection of clients' motivational language as opposed to general reflection. Furthermore, utilizing item response theory methods (Wilson, 2005), we rigorously developed a measure of MI competence to be used with standard patient interactions that could be completed and coded in real time during coaching sessions for immediate feedback and corrective skills building activities (Naar et al.,

under review; Naar & Safren, 2007). Finally, we added a five-minute introduction to the coaching session where the coach utilized MI to increase CHW motivation for intervention participation.

The purpose of the current study was to test the proof-of-concept of TMI (ORBIT Phase 2a) to improve CHW competence in using MI to promote engagement in care in YLH. We hypothesized that TMI would be acceptable and feasible (CHW satisfaction and retention in the intervention) and would show a signal of efficacy of improving CHWs MI competence scores and maintaining them using an innovative statistical method for small N proof-of-concept studies. The study is highly significant in its demonstration of the ORBIT model for developing *provider* behavioral interventions, critical to the implementation science and to improving the care of marginalized populations.

Method

A concurrent nested mixed-methods design was utilized (Creswell, Plano Clark, Gutmann, & Hanson, 2003). The dominant method was quantitative (quasi-experimental pretest posttest control group design with partial randomization) and was used to examine CHW's MI competence trajectories between the intervention and control groups, and within the intervention group across the 2-year study. The secondary nested method was qualitative (semi-structured interviews) and was used to identify barriers and facilitators of feasibility and acceptability at the individual and organizational level. In addition to University IRB approval, each site had local IRB/ethics committee approval, and protocol registration approval from the Adolescent Trials Network (ATN Protocol 128). Participants provided informed consent.

Participants

ATN 128 was multi-agency project - a Minority AIDS Initiative from the Health Resources and Services Administration (HRSA) in collaboration with National Institutes of Child Health and Human Development and the Centers for Disease Control (Fortenberry et al., 2017). Longitudinal data were collected from 19 CHWs at 16 youth HIV health service organizations. CHWs from 8 ATN and HRSA sites that were in the same region were assigned to the TMI group per HRSA's request. The remaining 8 ATN sites were randomly assigned to TMI or services as usual.

Procedures

CHWs completed one 10-20 minute standard patient interaction by phone prior to intervention initiation, which were audio recorded and coded for MI competence (see measures below). After initiating the intervention, CHWs in the intervention group completed role plays as part of coaching sessions, initially monthly then quarterly over two years for a total of 15 codes. Control CHWs completed one pre-implementation standard patient interaction, followed by monthly standard patient interactions for six months resulting in a total of 7 competence scores. They did not receive a workshop, coaching or feedback on their scores. CHWs in the intervention group completed exit interviews at the end of the project.

TMI Provider Intervention. TMI begins with a 2-day workshop delivered by a member of the Motivational Interviewing Network of Trainers that was refined to focus on MI skills identified in our prior communication studies, cooperative learning experiential activities, video examples tailored for HIV with diverse providers and clients, and role play activities consisting of modeling, behavioral rehearsal and feedback. The two days are are organized in 6 modules: 1) introduction to MI; 2) TMI spirit and stigma reduction; 3) managing counter change talk and discord with empathy and autonomy support; 4) recognizing and reinforcing change talk; 5)

eliciting change talk with open questions; and 6) TMI processes. In ATN 128, the third day focused on practicing TMI interactions for different contexts and behaviors (e.g., HIV testing, linkage to HIV care, retention in care, medication adherence, linkage to mental health, substance use or support services). Following the three-day training, CHWs received phone coaching, monthly for six months then quarterly. The 45-60 minute coaching sessions consisted of five components: 1) 5 minutes eliciting provider change talk for improving MI competence; 2) completion of standardized patient interaction with real time coding; 3) discussion of strengths and areas for improvement; 4) practice activities related to areas for improvement; and 5) goal setting for improving competence. Coaching sessions were recorded and one per month randomly selected by an external MI trainer for review and feedback to the TMI coach.

Measures

MI Coach Rating Scale (MI-CRS). Utilizing item response theory (IRT) methods, we developed a 12-item measure, rated on a 4-oint scale (Poor, Fair, Good, Excellent) that can be used by MI coaches as well as researchers and is designed to be rated in one pass of real or simulated encounters. The items represented essential MI components such as a collaborative stance, autonomy support, open questions to elicit motivational language (i.e., change talk), reflections of change talk, affirmations, and summaries. The measure has demonstrated reliability and validity on several indicators using Rasch modeling in diverse settings and samples (Naar et al., under review). First, dimensionality results indicated that the MI-CRS appeared to measure a single underlying construct of MI competence as compared to other conceptions of MI skill as having at least two dimensions. Second, item-session maps were indicative of a well-performing instrument. Third, variance was primarily due to counselor versus client(s) or sessions, which is beneficial when rating provider competence as an

implementation outcome or for quality assurance and feedback loops. The four-point rating scale showed excellent functionality and good item fit. Using the mid-point of the rating scale, scores of less than 2.5 were considered "below" the clinically significant threshold, while scores greater than or equal to 2.5 were considered above the threshold.

Qualitative interview. To obtain CHW perceptions of barriers and facilitators for implementing MI in their clinical settings, the project director conducted a semi-structured interview with 13 (81.3%) CHWs in the intervention group and 3 (75%) CHWs in the control group. Overall, 84.2% of study participants completed the Year 1 qualitative interview. Interviews were conducted via telephone within six months after the completion of the last post-MI training interview, were digitally recorded, and lasted an average of 31 minutes. At the end of Year 2, 70% of CHWs continuing the MI training completed a second interview regarding TMI training, Year 2 interviews were a mean of 18.8 minutes, were conducted by telephone, and were digitally recorded.

Analysis

Descriptive statistics of competence scores were calculated for the intervention and control groups at baseline, and the end of Years 1 and 2. Differences between groups at baseline and the end of Year 1 (control group did not have Year 2 outcome data) in mean competence scores, as well as the change over time within the intervention group, were examined using a t-test and ANOVA, respectively. Descriptive statistics of implementation adherence (coaching session attendance) were calculated for the intervention group across Years 1 and 2. In bivariate analysis, we also categorized MI competence scores into three levels: "solid" (mean scores > 3.5), "beginner" (mean scores between 2.5 and 3.5), and "below" (mean scores < 2.5). Difference in competence category at baseline and end of Years 1 and 2 were assessed using the

McNemar test. Finally, we examined the correlation between coaching session attendance and MI competence at the final assessment available.

Longitudinal data of competence scores were collected at baseline and then 9 times for CHWs in the intervention group and 6 times for CHWs in the control group over Year 1 of the study. A random coefficient model was used to examine time trajectories of MI competence scores and the influence of intervention group assignment on CHWs' trajectories. A second random coefficient model examined the time trajectories of MI competence among CHWs in the intervention group across both years of the study (15 post-intervention assessments). Within this model, we tested whether CHWs' trajectories varied by implementation adherence. These models allow the CHW-specific coefficient describing individual time trajectories to vary randomly. The top-down strategy was used to build an appropriate random coefficient model for this longitudinal data. The SAS software PROC MIXED procedure was used for all random coefficient models (v9.4, 2013).

For qualitative semi-structured interviews, the authors prepared two databases (Years 1 and 2), containing the responses of each participant to all structured and probed questions asked. The database resulted in a total of 770 independent units of data, 560 in Year 1 and 210 in Year 2. We utilized rapid content analysis recommended to produce actionable information to planners and decision makers (Kleinheksel et al., 2020). Steps include summarizing individual transcripts utilizing the semi-structured interview as a table template yielding the independent units of data, and then consolidating the summaries for both years of data by the main themes (Gale et al., 2019). Themes included site organization and structure, anticipated barriers, and anticipated facilitators, sustainability, and ongoing support.

Results

MI-CRS Between Subjects Analysis

At baseline, there was no significant difference in mean scores of MI competence between the intervention and control groups (2.46 vs. 2.47, $t = 0.03$, $p = 0.979$); however, a significant mean difference was found (2.93 vs. 2.28, $t = 3.89$, $p = 0.0012$) at the end of Year 1. At baseline, there were 9 CHWs whose MI competence scores were less than 2.5 ("below" category) and 7 CHWs whose mean scores equal or above 2.5. At the end of Year 1 and Year 2 follow-ups, 15 CHWs scored above the 2.5 threshold and only one CHW demonstrated a competence score less than 2.5 ("below") in the intervention group. The McNemar test indicated a significant increase in the proportion of above threshold in the intervention group from baseline to the end of Year 1 ($p = 0.0133$), and this change was sustained at the end of Year 2. There were only three CHWs in the control group. At baseline, two CHWs were above the threshold and one CHW's scored below 2.5. At the Year 1 follow-up, there were two CHWs whose MI competence scores fell below 2.5 and one sustained above threshold.

Plots of the observed competence scores for individual CHWs showed substantial variation between CHWs within the intervention and control groups (Figure 1). The competence scores for CHWs in the intervention group tended to increase over time, whereas there were great fluctuations in competence scores among control group CHWs. Overall, there was decreasing between-CHW variability in the competence scores in the intervention group but increasing between-CHW variability in the control group competence scores.

CHWs in the intervention group participated in a mean of 12.50 (SD = 3.52, min = 7, max = 16) standard patient interactions. Moreover, 56.3% of CHWs participated in at least 15 of 16 coaching sessions suggesting more than half of CHWs had near perfect adherence to the TMI

intervention protocol. Finally, intervention retention (number of sessions completed) was marginally correlated with MI competence at the final Year 2 assessment (r = .50, p = .051).

A full random coefficient model was constructed by including both linear and quadratic fixed effects of time, intervention group, and interactions between the linear and quadratic effects of time and intervention group, and CHWs' implementation adherence, sex, length of time in CHW position, and whether the site was from the ATN or HRSA. The purpose of this model was to assess the influence of intervention group assignment on trajectories of MI competence scores. This model was restricted to MI-CRS data in Year 1 so that the intervention and control groups were in the same study period. CHWs' adherence, sex, time in CHW position, site, quadratic, and quadratic by group assignment terms were removed from the final model as they were not significant (removal did not change final model results). The results of this final random coefficient model showed a significant interaction between intervention group and time (β = 0.080, SE = 0.023, t = 3.53, p = 0.001), suggesting that the intervention and control groups were not showing the same linear trend in MI-CRS scores. The slope of the intervention group was positive and statistically significant (β = 0.036, SE = 0.008, t = 4.58, $p < 0.001$) whereas the slope of the control group was negative and significant (β = -0.044, SE = 0.021, t = -2.07, p = 0.040). Overall, results from this model suggest that MI-CRS scores increased over time for the intervention group but decreased over time for the control group (Table 1).

Within Subject Trajectories for the Intervention Group

To further investigate the MI competence trajectories of CHWs participating in the intervention group across the full two years of the study, we analyzed a random coefficient model that included linear and quadratic fixed effects of time, and CHWs' implementation adherence, sex, time in CHW position, and whether the site was from the ATN or HRSA.

Neither adherence nor the covariates were significant and were therefore removed from the model (exclusion from the model did not change model results). Results of the random coefficient model indicated a significant linear ($\beta = 0.031$, SE = 0.008, $t = 3.89$, $p = 0.0001$) and quadratic effect of time ($\beta = -0.0006$, SE = 0.0002, $t = -2.83$, $p = 0.005$), suggesting that MI-CRS scores increased significantly at the beginning of the intervention but the rate of change became less steep over time. Moreover, the growth curve remained relatively flat until the end of the intervention period. In order to explore at what time point(s) the rate of increase in MI-CRS scores started to decrease, we recoded time as a categorical variable in this random coefficient model. The results indicated that MI-CRS scores increased steeply from baseline to Time 6 (i.e., the first three months after training), but were relatively flat from Time 6 to Time 15 (end of Year 2). Gains in MI competence from Times 6-14 were not significantly greater than the MI competence achieved by Time 6, and MI-CRS scores at Times 6-14 were not significantly lower than the score at Time 15. Moreover, using Time 1 (baseline) as the reference, we found that MI-CRS scores at Times 2-15 were significantly greater than the baseline score. In other words, gains in MI competence did not substantially increase beyond Time 6, nor did they decrease enough to indicate a significant loss of MI competence at the end of Year 2.

Qualitative Content Analysis

Barriers and facilitators to implementing MI. Time was the most commonly reported (31.3%) barrier to implementing MI. The concept of insufficient time manifested in several ways. First, CHWs indicated the standard allotted time with patients could be too short to use MI or use it in an effective manner. Time also arose at the organizational level with policies requiring clients to be engaged in care within six weeks competing with the priority to use MI prior to youth being established in care. Moreover, the additional time to chart was mentioned as

a perceived organizational barrier as this could lead to longer patient wait times. Finally, the amount of time required for training could prohibit a more wide-spread use of MI across the service provider spectrum. However, 43.8% of CHWs reported a lack of barriers to implementing MI, predominantly because MI was already part of the care practices of the organization. With regard to facilitators, it was noted that training on MI across the members of the organization would lead to greater 'buy-in' and result in more systematic use of MI. CHWs provided clear consensus that providing the TMI intervention to all medical, mental health, and social work providers who have contact with YLH would increase the likelihood of MI being a long-term sustainable practice. Other suggested facilitators included allotting more time to conduct MI during standard patient interactions, making MI required by the organization, and beginning a patient's first visit with MI, versus with patients who had seen the CHW before the onset of the study. Majority emphasized the need for ongoing refresher MI training that included new and updated information to help CHWs sustain their use of MI.

TMI intervention protocol. At the end of the second year, CHWs in the intervention group provided insight into their experiences and thoughts about the TMI intervention. CHWs described the coaching calls and role play practice with an MI trainer as the most useful component of the protocol. Half the CHWs further elaborated that the immediate feedback facilitated identifying both strengths and weaknesses, and that hearing back the recording of the standard patient interaction during coaching was especially useful. Some CHWs reported the length of the coaching session was either too long or occurred too frequently. However, most of CHWs agreed the amount of training received was just right. Finally, CHWs recommended more in person booster training, and that the group boosters were less stressful as there was not a coding component.

Discussion

The power of evidence-based practices to promote change in real-world settings rests in adaptation to the service environment and in improving provider competence to ensure fidelity to implementation. To achieve this goal, behavioral interventions to improve provider competence in the delivery of such evidence-based practices is critical. Early phase translation of behavioral and social science can further best practices in implementation science by improving the specification of implementation strategies focused on provider behavior change interventions (Proctor, Powell, & McMillen, 2013). Furthermore, interventions to improve competency in MI, a highly disseminated evidence-based practice, are highly significant. We first defined and refined such a provider intervention, translated from basic behavioral science, educational research, and communication science studies. It is important to note that such early phase intervention development for provider interventions may be expediently achieved during traditional clinical trials of the resulting evidence-based practice. In the current study, we tested the proof of concept of the TMI intervention to improve CHWs MI competence when working with minority youth that was translated, defined and refined from the basic behavioral science of skills acquisition, research in educational environments, and communication science studies. Using innovative methodology for small samples, we examined whether TMI showed a signal of effect by examining CHWs competence score trajectories, both within subjects and compared to a control group in a quasi-experimental design. Proof of concept was demonstrated as pre-training competence scores did not vary between groups, but competence scores at the end of Year 1 were significantly higher in the intervention group relative to the control group. Moreover, the growth trajectories of the two groups were significantly different across the first year. As expected, CHWs in the intervention group evidenced a significant increase in

competence ratings; however, control group CHWs displayed a significant decrease in competence. There were also significant improvements in percent of the intervention group reaching the clinically significant threshold following intervention.

Finally, across a two-year period following the centralized training, CHWs' MI competence showed significant incremental increases from time 2 to 6, with nonsignificant increases subsequently. Although gains were not evident beyond the first three months, MI competence was sustained across the two-year study. That is, at no point did MI competence significantly decrease between successive time points and the baseline and final competence scores were significantly different. These data suggest that TMI could be conceptualized as a three-month intervention with a subsequent tapering dose of coaching to maintain skills. Furthermore, variability in MI scores suggests the intervention had a smaller effect on some CHWs and may indicate the need for more individually tailored dose of coaching based on competence ratings.

While high adherence to coaching sessions suggested feasibility, identification of structural and individual-level barriers and facilitators are critical for supporting implementation (Aarons et al., 2012; Aarons et al., 2014; Aarons, Hurlburt, & Horwitz, 2011). Time was the most frequently reported barrier with effects at both the organizational and individual-level. CHWs' perceived the utilization of MI would increase the amount of time needed to conduct one-on-one sessions with youth (i.e., individual-level) which may increase patient wait times (i.e., organizational level). Furthermore, there was some variability in perceptions of length of the intervention, and some CHWs believed the time required to participate in the training would deter a wider uptake of MI across clinic staff (e.g., medical providers). Thus, future studies may consider ways to shorten training or adapt dosing to provider competence levels.

Limitations include the small sample size, especially of control CHWs, and the lack of a fully randomized design. However, in the ORBIT model, a control group is not typically included in a proof of concept study (ORBIT Phase 2a), thus the next step would be a pilot randomized trial comparing the TMI intervention group to a control condition (ORBIT Phase 2b). Furthermore, the inclusion of a follow-up period without coaching would yield important information about the sustainability of MI competence. Additionally, the competency guidelines that we utilized as a clinically significant endpoint (at least beginner level) were developed with a different instrument (the MITI versus the MI-CRS). Because the ORBIT model is recursive, we are currently analyzing provider competency levels and client outcomes such as viral suppression and retention in care in stepped-wedge cluster randomized trial with 10 HIV clinics (Naar et al., 2019). This study will include all providers at the clinic and ensure that coders are blind to condition. This trial will also assess the effect of trigger-based coaching where providers receive mandatory quarterly coaching sessions over 12 months if competence scores are low, and coaching is optional if competency scores are adequate. Finally, this trial will address sustainment by assessing competency over a 12 month sustainment period without any intervention.

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Table 1 Random coefficient model assessing the influence of intervention on time trajectories of MI fidelity scores

Variables	β	SE	*t*	p
Fixed effect				
Intercept	2.581	0.187	13.79	<0.0001
Time	-0.044	0.021	-2.07	0.0405
Intervention group				
Intervention	-0.039	0.200	-0.19	0.8479
Control (ref)				
Intervention×Time	0.080	0.023	3.53	0.0006
Random effect				
Intercept	0.041	0.018	2.27	0.0229

Figure. 1 Spaghetti plots for CHWs' MI fidelity trajectories across the first year of MI training. CHWs in the intervention group are presented on the left and CHWs in the control group are on the right.