Evaluation of a Randomized Intervention to Increase Adoption of Comparative Effectiveness Research by Community Health Organizations

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Abstract

This randomized controlled trial examined the influence of two strategies (informational packets alone and in conjunction with Webinars) aimed at increasing the adoption of motivational interviewing (MI), a patient-centered behavioral health practice supported by evidence from comparative effectiveness studies, among community health organizations responsible for delivering mental and behavioral health services. Data were obtained from 311 directors and staff across 92 community organizations. Hierarchical linear modeling was used to examine changes in decision to adopt MI. The mediating effects of multiple contextual variables were also examined. Results showed that both strategies positively influenced the decision to adopt. The positive impact on decision to adopt was significantly greater among individuals that received

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informational packets in conjunction with Webinars. Baseline attitudes toward evidence-based practices and pressures for change appeared to mediate this effect.

Introduction

If effective public health programs, products, and practices are not widely and effectively disseminated and implemented, they will not achieve their potential impact to improve the public's health.[1] Recent studies in comparative effectiveness or translational research (CER) have focused on improving the dissemination and implementation of evidence-based practices (EBPs) to healthcare settings. Despite the acknowledgment that dissemination and implementation of evidence-based health behavior change interventions is a high priority across many sectors, there appears to be no consensus on the best methods for accomplishing it.[2] This randomized controlled trial evaluates two strategies aimed at increasing the adoption of motivational interviewing (MI), a patient-centered behavioral health practice, among community health organizations responsible for delivering mental and behavioral health services across the USA.

There are multiple frameworks for examining the translation of EBPs into practice. Consistent with current definitions set forth by the National Institutes of Health,[3] these frameworks often rely on the constructs of diffusion, dissemination, and implementation to understand how EBPs are adopted, implemented, and sustained by organizations and individuals. Diffusion is a broad, overarching concept which generally refers to the process by which members of a social system (e.g., a community health care provider) learn about, decide about, and act on new ideas, practices, or objects, including EBPs.[4] Recent literature has acknowledged the complexities involved in the diffusion process and the need to further distinguish the specific processes involved to facilitate adequate understanding.[3, 5] As such, it is critical to consider more narrowly defined constructs, like dissemination and implementation. Dissemination involves targeting the distribution of information necessary for the implementation of a new program or practice to the intended audience.[3] Implementation refers to the strategies that can be used to adopt, integrate, and sustain practice changes within a particular setting.[3] A better understanding of how dissemination and implementation strategies influence the adoption of EBPs is critical in reducing the time it takes for new evidence to be routinely implementing in practice.

The Diffusion of Innovations Theory (DIT) was used to guide the development of this study.[4] DIT provides a descriptive theoretical framework based on an empirical review of diffusion research studies from disciplines such as agriculture, medicine, sociology, and marketing. The theory attempts to explain how and why innovations (e.g., EBPs) are disseminated from research settings and implemented into standard clinical care. It takes into account not only the broad process of diffusion but also the importance of prior conditions within a social system.[4] Research suggests that an understanding of the variables that affect the diffusion process can help to inform the effective dissemination and implementation of EBPs.[6] Four key elements of DIT are expected to affect dissemination and diffusion: the innovation itself, the communication channels through which information about the EBP is transferred, the timing of the diffusion, and the social system where the diffusion takes place. Embedded in this is the innovation–decision process which postulates that members or units of a social system go through a five-stage innovation decision-making process consisting of: (1) knowledge; (2) persuasion; (3) decision; (4) implementation; and (5) confirmation. Dissemination and implementation strategies can target any stage in this process; however, little is known about which strategies are most effective at which stage in the process.[1, 7, 8] For example, little is known about the kinds of strategies that are effective in helping organizations make an appropriate decision as to whether to adopt a particular EBP. To address this gap, this study focused on the first half of the innovation–decision process; that is, the effects of strategies targeting knowledge and persuasion on decision making.

Chambers and Kerner[9] set forth a continuum of dissemination strategies ranging from the objective (e.g., scientific literature summarized in systematic reviews, individual scientific studies) to the more subjective (e.g., qualitative data, media or marketing data, word of mouth, personal experience). Some studies have concluded that active dissemination strategies (e.g., interactive workshops, educational outreach, seminars) are critical to successful diffusion,[2, 10, 11] while others have found that passive strategies (e.g., printed educational materials) are equally effective as active or more tailored ones.[12–16] Several systematic reviews have been conducted evaluating the effectiveness of passive strategies.[17–23] The findings of these reviews indicate that when used alone, passive strategies are effective in increasing knowledge but have minimal effects on behavior change. The combination of passive and active strategies is much more likely to produce change.

In addition to particular strategies for dissemination and implementation, it is important to account for the multiple factors that may influence this process. Research suggests that an understanding of the variables that affect the transfer process can help to inform the adoption and implementation of the EBPs.[6] This literature, including literature based on DIT, indicates that the diffusion of an innovation can be affected by the characteristics of the EBP itself, the characteristics of the organization that may adopt it, and the individuals involved in the decision to adopt and the implementation of the innovation.[1]

Features of intervention programs (i.e., innovations or EBPs) found to affect their diffusion include the innovation's relative advantage over existing practice, compatibility with current practices, complexity, trialability (i.e., the degree with which the innovation can be experimented), and observability (i.e., the visibility of the results to others).[1, 2, 4] Importantly, it is not only the features of the innovation that affect its transferability into practice but also how decision makers and practitioners *perceive* those features. Dissemination is therefore a key component in communicating program features to those who may implement the EBP.

Organizational characteristics that affect dissemination and diffusion can include a climate that values innovation and/or shared decision making between administrators and frontline staff, and active support by leaders for a new EBP.[24, 25] In addition, the extent to which time, money, and human resources devoted to implementation are seen as available has a considerable influence on the decision to adopt. Organizations are more likely to choose innovations that fit well with their strategic plans, missions, and philosophies of treatment.[26] Organizational readiness to adopt an innovation is a critical factor in the decision to adopt and in subsequent implementation.[27] Indicators of organizational readiness include the perceived risk of adopting a practice, the organization's capacity to manage risk (including past experience implementing new innovations), resource availability, and staff capacity.[28–31]

Individual-level factors, or characteristics of decision makers and practitioners, are also critical to the diffusion of an EBP. Characteristics of individual providers such as gender, age, ethnicity, educational status, and years of professional experience have been associated with the adoption of EBPs,[32–34] and these factors may vary by position within the organization.[35] Provider attitudes toward EBPs and their views about their organization as well as the new EBP under consideration may serve as facilitators or barriers to EBP implementation.[32] Adoption is often facilitated if staff are familiar with the EBP, recognize its utility, and see it as similar to other practices they currently implement.[36, 37] Feeling supported by one's organization through positive leadership and allocation of resources can also facilitate the adoption process.[28, 29, 31, 38, 39]

There are a number of gaps in the literature about effective dissemination and diffusion of EBPs, and more research is needed to determine if the effectiveness of dissemination and implementation strategies is influenced by the target population, intervention or practice being disseminated, or intended outcome.[40–43] Few studies have examined the mediating effect of programmatic, individual, and organizational factors on the impact of various dissemination strategies. Damanpour and Schneider[44] examined the input of varying contextual factors on effective dissemination strategies and found that organizational characteristics and managers' receptiveness toward innovations were more predictive of

EBP diffusion than environmental factors or managers' demographic characteristics. However, more research is needed to explore the interaction among individual, organizational, and programmatic characteristics that affect the adoption and implementation of EBPs.[1, 6, 45]

The current study addresses several of the limitations in our understanding of effective dissemination and implementation strategies on the diffusion of EBPs. The purpose of this study was to examine the influence of two different strategies—one passive and the other active—on the decision to adopt MI. This study targets individuals and organizations which are early on in the adoption decision-making process; that is, those who are not familiar with MI or are contemplating its use, rather than those who have already made a decision to implement. The potential mediating effects of multiple contextual variables are also examined through this work.

Methods

This section provides a brief description of the methodology used in this study. More specific information regarding the study design and methodology is published elsewhere.[46]

Intervention study design

This study used a nested, experimental design to examine the influence of two different dissemination strategies on the decision to adopt a patient-centered behavioral health practice among organizations responsible for delivering community-based behavioral health services, namely, community behavioral health organizations (CBHOs) and community health centers (CHCs). Participating organizations were matched based on organization type, size, revenue, and geographic location. One organization from each matched pair was randomly assigned to receive either strategy 1 (informational packets alone—control) or strategy 2 (informational packets in combination with Webinars—intervention). The other organization in each matched pair was, by default, assigned to the other group.

MI was the EBP chosen for this study because of its solid evidence base in empirical trials, including CER trials, and consistency with the current practice structure of both CBHOs and CHCs. MI is a counseling approach that attempts to increase the patient's or consumer's awareness of the potential problems, consequences, and risks resulting from the particular behavior in question. It can be adapted to treat different conditions across different population types. MI is also relatively inexpensive to implement, which helps control for this potential influence on the study outcomes.

Sample

The target population included CBHOs and CHCs responsible for providing mental and behavioral health services in the USA. CBHOs and CHCs were initially contacted via email by the national associations representing these organizations (the National Council for Community Behavioral Healthcare and the National Association of Community Health Centers). Emails were sent to points-of-contact at approximately 3,209 organizations (1,953 CBHOs; 1,256 CHCs). In addition, the study was advertised on the national associations' Web sites and via newsletters. Three hundred forty-five organizations responded with interest in the study. Of these, 117 organizations met the eligibility criteria and were asked to participate in the study.

To be eligible, an organization had to be a CBHO or CHC and not currently implementing MI systematically throughout the organization. Eligible organizations were asked to provide the names and contact information for individuals who would be participating in the study. They were told that participants should be individuals within the organization who are responsible for making decisions regarding the adoption of new practices. No restrictions were placed on an individual's position within the organization (e.g., director, practitioner) or the number of individuals that could participate. The

rationale for allowing multiple individuals to participate from each organization was to better understand the "real world" decision-making process (e.g., number and characteristics of decision makers involved, agreement among participants within the same organization) that takes place within these organizations when considering the adoption of a new EBP. Detailed analyses and results of this decision-making process are presented elsewhere.[35]

One hundred nine organizations provided the contact information for study participants, all of which were sent consent forms. Upon completion of the consent form, participants were sent a baseline survey. Three hundred eleven participants representing 92 organizations (43 CBHOs; 49 CHCs) provided consent and completed baseline surveys, comprising the final sample for the study. Of the 92 organizations, 65 (70.7 %) had more than one participant, with an average of three participants per organization (range 1–11).

Description of interventions

Two different strategies were evaluated in this study. The first was a passive strategy and consisted of an informational packet administered to participants in the control group. The purpose of the packet was to disseminate information to organizations to assist them in making a decision about the adoption of MI. The second strategy was active and consisted of participation in two Webinars: one focused on implementation and the second on coaching. While traditionally, Webinars have been used more as a passive strategy delivered in a lecture style format, one of the main purposes of this study was to demonstrate how Webinars can be used more "actively" as a dissemination and implementation strategy. The purpose of the implementation Webinar was to reinforce the information provided in the packet and provide participants with the opportunity to ask general questions about MI. The purpose of the coaching Webinar was to provide one-on-one guidance to organizations regarding the adoption and integration of MI through interaction with an expert in MI implementation. Because the purpose was to examine the effects of these interactive Webinars above and beyond that of the packets, those in the intervention group received the same packet as those in the control group in addition to the Webinars. More detailed information about the development of these dissemination strategies follows.

Informational Packets The informational packet consisted of a colored two-page quick reference sheet and a 12-page document, similar to informational packets typically made available to organizations and practitioners by entities such as the Agency for Healthcare Research and Quality. It included information related to the core components of the practice, adaptations, evidence from the literature on harms and benefits including CER evidence, dissemination, and implementation resources, and examples of interventions utilizing the practice. The content of the packets was tailored to meet the needs of the study participants so that two versions of the packet were developed: one for behavioral health providers and the other for community health providers. The rationale for developing the packets was to provide organizations with information to assist them in making a decision about the adoption of MI.

The packet was reviewed by members of the study team, three implementation science experts, three active trainers from the Motivational Interviewing Network of Trainers (MINT), and two directors from the National Council for Community Behavioral Healthcare and the National Association of Community Health Centers. Feedback from these reviewers was incorporated into a final draft that was then pilot tested by eight members of the target population (five reviewers from CHCs and three reviewers from CBHOs).

Webinars Three Webinar leaders, chosen from a list of MINT individuals recommended by Dr. William R. Miller (a developer of MI), were selected to lead the implementation and coaching Webinars based on interest, availability, and experience supporting the implementation of MI within community health and/ or behavioral health settings. Webinar leaders used information provided in the MI informational packet

to develop detailed presentation outlines for the 1-h Webinars. Interactive PowerPoint presentations including surveys and other group activities for participant engagement were developed for delivery through Microsoft Live Meeting and provided to intervention group participants. Webinars were tailored to meet the individual needs of CBHOs and CHCs. Webinars were pilot tested with CBHO and CHC organizations and refined based on feedback from the pilot tests.

Implementation Webinars One MI expert presented ten didactic Webinars (five for CBHOs and five for CHCs). The Webinars were designed to reiterate information presented in the MI informational packet including staff selection; determining agency fit; training and support options; fidelity and outcome monitoring considerations; budget; and sustainability. Barriers and facilitators of successful MI implementation were also discussed.

Coaching Webinars Two MI experts led private, interactive coaching Webinars for each intervention group organization approximately 1 month after completion of the implementation Webinars. Coaching Webinars were designed to encourage participants to discuss specific barriers and facilitators for MI adoption within their organization and incorporated worksheets for Webinar participants to complete in real time. Coaching worksheets allowed participants to expound on the specific facilitators and barriers that applied to their organization, providing opportunities for Webinar leaders to use MI techniques to elicit change talk to encourage behavioral change at the organizational level in the form of MI adoption.

Data collection procedures

Data were collected through the administration of three separate surveys (a baseline survey and two followup surveys). The baseline survey was administered at the beginning of the study prior to receipt of the informational packets. The followup survey was administered 1 month after completing all intervention components and again 3 months after completing all intervention components. Participants submitted their responses for all surveys via Qualtrics, a third-party online Web-based survey platform, and were given 2 weeks to complete. Each survey took approximately 25–30 min to finish. Three hundred eleven individuals completed the baseline survey; 248 (80 %) completed at least one followup survey with 225 (72 %) participants completing the first followup and 228 (73 %) completing the second followup. Both followup surveys were completed by 205 (66 %) participants.

Measures

Dependent measures

Table 1 presents the specific variables used in this analysis by instrument. The primary outcome measure was decision to adopt MI. For purposes of this study, decision to adopt MI was conceptualized as a continuum of stages individuals go through during the decision-making process. As such, the operationalization of this construct is based on a stage of change model[47] and was adapted from McGovern and colleagues.[48] A single question asked participants to "Please indicate your level of interest in adopting MI into your program." Responses included 0=I am not familiar with MI; 1=I am not interested and do not think this practice would be effective in my program (precontemplative); 2=I have considered MI but see many pros and cons (contemplative); 3=I am leaning in the direction of adopting MI in my program (preparation); 4=I have just begun to implement MI in my work (action); 5=I have been using MI, and efforts are in place to maintain it (maintenance).

Several additional dependent variables were modeled in this analysis to explore potential mechanisms for observed changes including (1) attitudes toward EBPs, (2) pressure for change, (3) barriers to EBPs, (4) resources, (5) staff attributes, (6) organizational climate, (7) management

strategies related to training, and (8) management strategies related to reading materials. These variables and their psychometric properties are described in detail elsewhere.[46]

Predictor variables

Several variables were used as potential predictors for each dependent variable. Predictor variables included (1) participant demographics (sex, race, position at organization, type of organization, number of years worked in health care); (2) number of practitioners with direct client contact; and (3) number of organizational assessments conducted within the organization focused on readiness (e.g., resources, climate). Instrumentation and psychometric properties of each variable are described further elsewhere[46] and summarized in Table 1.

Data analyses

Descriptive statistical analyses were conducted using SPSS 19 (IBM, Armonk, NY, USA). Chi-square and t tests were used to identify differences between intervention and control groups. The association of the intervention with changes in respondents' decision to adopt MI score was assessed using three-level hierarchical linear models in SAS 9.2 (SAS Institute, Inc., Cary, NC, USA). This approach to the analysis appropriately estimates error while accounting for repeated measures on individuals and clustering within

Table 1
Predictor and dependent variables by measurement tool

Measurement Tool	Variable
Predictor variables	
Demographics	Sex
	Race
	Position at organization
	Type of organization (CBHO, CHC)
	Number of years worked in health care
Survey of structure and operations[55]	Number of organizational assessments
	Number of practitioners with direct client contact
Dependent variables	
Decision to adopt stages of change scale (adaptation from McGovern and colleagues)[48]	Decision to adopt MI
Organizational readiness for change director and staff versions[56, 57]	Pressures for change
	Resources
	Staff attributes
	Organizational climate
Survey instrument for measuring organizational barriers to implementing evidence-based practices[36]	Barriers to EBPs
Management strategies to support evidence-based practices[36]	Trainings
	Reading materials
Evidence-based practice attitude scale[58]	Attitudes toward EBPs

organizations. Random intercepts were included in the model, but random slopes were not included due to inclusion of a high number of starting parameters. Individuals who reported that they were implementing MI at baseline were excluded because the intervention was designed to promote adoption rather than maintenance. Changes in decision to adopt MI among intervention participants were compared to the changes among control participants to determine whether the intervention was associated with greater improvement after baseline. Additional candidate predictor variables were chosen based on previous cross-sectional analyses examining decision to adopt as the outcome in a two-level hierarchical linear model.[49] To explore potential mechanisms for improved changes in the intervention group, models were also developed using the following secondary dependent variables; attitudes toward EBPs, pressure for change, barriers to EBPs, resources, staff attributes, organizational climate, training, and reading materials.

Two variables were specified as level 1 predictors: (1) postintervention observation (yes/no) and (2) followup 2 observation (yes/no). The estimates for postintervention represent differences between all postintervention observations as compared to baseline observations, while estimates for followup 2 were used to examine effects associated with later followup (3 months after the intervention) as compared to the first followup (1 month after the intervention).

Four variables were specified as level 2 predictors: (1) sex (male/female), (2) race (Black/African American compared to other races), (3) position (staff/directors), and (4) number of years worked in health care (1=less than 1 year; 2=1 to 3 years; 3=3 to 5 years; 4=more than 5 years). Sex, race, and position were entered into the model uncentered. In contrast, number of years worked in health care was centered on the group mean for each organization to model within-group variation. The centering decision does not impact significance of the results but does influence interpretation of the coefficients. In this case, each respondent is measured against the mean of that variable (e.g., number of years worked in health care) for the organization.

Three variables were specified as level 3 predictors: (1) intervention group (yes/no), (2) number of practitioners with direct client contact (0=less than 10; 1=10 to 20; 2=more than 20), and (3) number of organizational assessments used (range=0–4). Intervention was entered into the model uncentered. The number of practitioners and number of organizational assessments were centered on the grand mean for all participating organizations to model between-group variation.

The intervention's association with improved postintervention changes as compared to the control group was assessed using two cross-level interactions: (1) postintervention observation * intervention and (2) followup 2 observation * intervention. The first term tests whether postintervention outcome changes among intervention participants were different from postintervention changes among control participants. The second term compares potential changes at the later followup by receipt of intervention.

A parsimonious model was selected by comparing the Akaike Information Criteria (AIC) for each combination of covariates in separate models, using maximum likelihood estimation to support comparisons between models with different fixed effects. AIC provides a method for selecting a model based upon fit while also maintaining parsimony by penalizing models with more parameters. Using the fixed effects from the best fit model, the model was fit using restricted maximum likelihood. Given the relatively small number of level 3 units (organizations), standard rather than robust estimates were used.[50, 51]

Results

Participants and organizations

Detailed demographics of the individuals and organizations that participated in this study are presented elsewhere.[35] In summary, participants tended to be White (78.8 %), female (75.9 %), directors (71.1 %), in their mid-to-late 40s (M=47.0, SD=11.3), with master's (63.7 %) or doctoral

degrees (19.6 %), more than 5 years of experience working in health care (86.5 %), and 1–3 years of experience working in their current position (40.8 %). Organizations tended to be located in urban areas (45.1 %), be in operation for more than 10 years (66.3 %), serve between 1,000 and 10,000 clients a year (42.5 %), and have fewer than ten practitioners with direct client contact (46.7 %). Generally, participants felt that their organizations were ready for change, held relatively positive attitudes toward EBPs, and reported few organizational barriers and several facilitators of EBP implementation. Mean scores for the predictor variables included in the current models were generally consistent with those found in other studies. Participants reported a wide range of interest in adopting MI at baseline. Approximately one-fifth of participants reported that they were not familiar with MI (23.1 %); another one-fifth stated that they had just begun implementing MI in their practice (21.1 %) and therefore were excluded from these analyses.

At baseline, there were no differences between intervention and control in the main dependent variable (i.e., decision to adopt MI) or secondary dependent variables. A few differences in demographic characteristics were found between intervention and control group including position within the organization and race. The proportion of staff in the intervention group (38.7 %) was significantly greater than that in the control group (17.5 %) ($X^2 = 16.90$, $p \leq .001$). Further, nearly one-fifth (19.6 %) of the intervention group were Black or African American compared to 7.7 % in the control group ($X^2 = 9.08$, $p \leq .01$).

Association of the intervention with decision to adopt MI

The results of the models are presented in Table 2. Decision to adopt MI scores increased for individuals at all organizations after the baseline assessment regardless of intervention ($\beta = 1.31$, $p \leq .001$). Individuals from organizations that received the intervention exhibited a significantly greater increase in decision to adopt MI score ($\beta = 0.43$, $p \leq .01$) when compared to individuals from organizations in the control group. The decision to adopt at followup 2 was not significantly different from the first followup, and the covariate for the second followup was dropped based upon model fit. The model was adjusted for covariates that improved the fit of the model including black race and number of practitioners.

Mechanisms for the association between the intervention and decision to adopt MI

To explore the potential mechanisms through which the intervention promoted a higher decision to adopt MI score, eight additional outcomes were analyzed controlling for the same candidate covariates included in the main analysis. The results of these analyses are provided in Table 2. Only attitudes toward EBPs changed significantly after the baseline time point, increasing at followup ($\beta = 0.59$, $p < .001$). The increase, however, was significantly smaller among individuals from organizations receiving the intervention ($\beta = -0.17$, $p \leq .05$). A significant difference in the pressures for change at followup was not observed ($\beta = -0.43$, $p = 0.474$), but an observed decline in pressures for change among individuals from intervention organizations was nearly significant ($\beta = -1.61$, $p = 0.065$). Later followup was associated with a significantly lower training score as compared to the first followup ($\beta = -0.08$, $p \leq .05$), but there were no differences by intervention group. No other significant differences were observed comparing changes in the intervention group to controls.

Discussion

This study presents evidence of the effectiveness of both passive and active dissemination strategies on positively impacting the decision to adopt a patient-centered behavioral health intervention among two types of community-based health organizations. Few randomized controlled trials have been conducted examining the effectiveness of different dissemination and implementation strategies early

Table 2

Hierarchical linear model analyses for decision to adopt MI and potential mediators

Effect	Decision to adopt MI (SE)	Attitudes toward EBPs (SE)	Pressure for change (SE)	Barriers to EBPs (SE)	Resources (SE)	Staff attributes (SE)	Organizational climate (SE)	Training (SE)	Reading materials (SE)
Fixed effects									
Level 1									
Intercept	1.83‡ (0.15)	2.32‡ (0.05)	30.88‡ (0.79)	2.51‡ (0.07)	36.47‡ (0.51)	38.02‡ (0.40)	35.06‡ (0.39)	0.90‡ (0.03)	0.69‡ (0.05)
Postintervention (reference=no)	1.31‡ (0.11)	0.59‡ (0.05)	−0.33 (0.62)	−0.01 (0.05)	0.05 (0.30)	0.02 (0.24)	0.20 (0.24)	0.03 (0.04)	−0.06 (0.05)
Second followup (reference=first followup)					0.34 (0.24)			−0.08 (0.03)*	
Level 2									
Position (reference =director)				0.17^ (0.09)	−1.79† (0.59)		−1.38† (0.48)	−0.10† (0.03)	−0.23‡ (0.06)
Black race (reference=no)	−0.73† (0.23)				1.21 (0.83)				0.15* (0.07)
Years worked in health care			1.82 (0.62)†						0.11* (0.05)
Level 3									
Intervention (reference=no)	−0.08 (0.21)	0.05 (0.07)	0.82 (1.12)	−0.06 (0.10)	−0.99 (0.72)	−0.52 (0.57)	0.08 (0.57)	0.08 (0.05)	0.08 (0.07)
Organizational assessments			−0.59 (0.32)△		0.40 (0.22)△	0.32 (0.18)△			
Number of practitioners	0.22* (0.10)	0.07* (0.03)		−0.11* (0.05)			0.63* (0.28)	0.03* (0.02)	0.06* (0.03)
Cross-level interactions									
Postintervention X intervention group	0.43† (0.16)	−0.17* (0.07)	−1.61^ (0.87)	−0.04 (0.07)	0.01 (0.39)	0.10 (0.34)	−0.31 (0.34)	−0.08 (0.06)	0.08 (0.07)
Variance components									
Level 1 (observation level)	0.74	0.12	23.35	0.16	4.47	3.39	3.32	0.09	0.15

Table 2
(continued)

Effect	Decision to adopt MI (SE)	Attitudes toward EBPs (SE)	Pressure for change (SE)	Barriers to EBPs (SE)	Resources (SE)	Staff attributes (SE)	Organizational climate (SE)	Training (SE)	Reading materials (SE)
Level 2 (person level)	$0.50^{\ddagger}$	$0.11^{\ddagger}$	$9.91^{\ddagger}$	$0.18^{\ddagger}$	$7.46^{\ddagger}$	$7.90^{\ddagger}$	$5.36^{\ddagger}$	0.01	$0.04^{\ddagger}$
Level 3 (organizational level)	$0.27^{\dagger}$	0	$9.68^{\dagger}$	0.05^{*}	$4.28^{\dagger}$	1.45^{*}	1.88^{*}	0	0.01

Covariates selected using backward selection with a $p=.05$ cutoff. Later followup (i.e., 3-month time point as compared to 1-month time point) and organizational assessments were dropped from all models. SE=standard error; $^{*}p<.05$; $^{\dagger}p<.01$; $^{\ddagger}p<.001$; $^{\wedge}p=0.06$; $^{\Delta}p=.07$

on in the decision-making process and even fewer targeting community health organizations (see Fixsen et al.[52] for summary of experimental research in this area).

The research design utilized in this study was a nested, randomized controlled trial in which organizations were matched based on several characteristics shown in previous literature to be associated with adoption and implementation. Such a study design has several strengths. Aside from the primary advantages of matching and randomization which minimized the potential for confounding by selection bias (important differences at baseline between the intervention and control group), and the prospective nature of the study, the design has the additional advantage that it acknowledges the nested nature of the decision-making process (groups of individual decision makers work within each organization) and allows simultaneous examination of the impact of the interventions at both the individual and organizational level. The use of a three-level hierarchical model to analyze data collected by this study allowed us to efficiently examine the impact of an intervention not only at both levels but also at different time points. Hierarchical models take into account the shared variance in hierarchically structured data and accurately estimate lower level slopes (individuals within an organization) and their implementation in estimating higher level outcomes (the organization).

In the present study, informational packets were administered to all participants, whereas those in the intervention group also received two interactive Webinars. Results showed that both interventions were effective in increasing participants' decision to adopt MI score, though the Webinars were significantly more effective than the packets. The demonstrated effectiveness of both dissemination strategies is not surprising given that previous research indicates that passive and active strategies are both effective in increasing knowledge.[17–23] It could be said that the interventions examined in this study were successful in increasing the decision to adopt MI by increasing knowledge and awareness of MI among study participants. While research, including this study, indicates that passive and active strategies are effective in increasing knowledge, this does not guarantee that participants will act on this new information. Previous research has found that while passive strategies are effective in increasing knowledge, active strategies are needed for behavior change. Followup research is needed to determine whether participants in this study acted on the information learned through the intervention components (i.e., took steps to implement MI into practice) and whether future implementation of MI varied by intervention group. Followup research could also examine if particular information provided during each intervention component was used by participants in their implementation efforts more than other types of information. For example, other work conducted under this project[53] found that participants reported liking information about the MI core components, approach, and tools and resources the most, whereas they liked the presentation of research findings as to the effectiveness of MI the least. Future work should examine the utility of each of these sections in the actual implementation of MI into practice.

Another area that remains unclear involves the cost-benefit of active vs. passive dissemination strategies. Although in this study, the Webinars were found to increase decision to adopt MI scores above and beyond that of the informational packets, they were also more costly to implement. Future work should be conducted to determine if the added benefit justifies the additional costs.

In the current study, followup data were collected at two time points, approximately 1 month after completion of the intervention components and again 3 months postintervention. Analyses were conducted to determine if any differences in outcomes were observed over time. One concern when implementing any kind of dissemination or training intervention is that there will be a "honeymoon effect" where participants are very motivated immediately after an intervention and this motivation wanes over time. No such differences in decision to adopt were found from followup 1 to followup 2, indicating consistency in the intervention effects at least over a short period of time (i.e., 2 months). Future research is needed to examine the consistency of effects over a longer time period.

Further analyses are also needed to explore the mechanisms for the association between the intervention and adoption of MI. Among the potential mediators explored, a differential postintervention change among intervention recipients was only observed for attitudes toward EBPs and pressures for

change. The smaller improvement in attitudes toward EBPs among intervention recipients is surprising, but the effect size was relatively small. The stronger reduction in pressures for change among intervention participants may indicate that the pressures for change become lower as individuals adopt EBPs.

Limitations

Several limitations of this study should be noted. Data represented self-reported information from individuals who volunteered to participate in a study aimed at better understanding of how community health organizations decide to adopt EBPs. Therefore, data may be limited by social desirability and recall bias, and generalizability may be limited to those with higher baseline levels of interest in EBPs. All participants were informed that surveys were confidential and responses would not be linked to individuals, potentially reducing the possibility of social desirability bias. In addition, the specific EBP being disseminated during this intervention (i.e., MI) was concealed during enrollment to help prevent at least some self-selection bias.

While matching and randomization were utilized with the aim of reducing selection bias, some between-group differences at baseline were identified. The proportion of staff in the intervention group was significantly greater than that in the control group, and the proportion of Black or African American participants in the intervention group was higher than that in the control group. Nonetheless, no baseline differences were observed for the primary or secondary outcome measures of interest, and the number of analyses of individual baseline variables was large.[35] The observation of the between-group differences at baseline may simply be the consequence of chance.

During the study, participants were not blinded to the intervention they were receiving, which may have introduced additional bias. However, participants were not told what intervention the other group was receiving, making it difficult to determine if they were receiving the control group condition or the intervention group condition. To test whether participants were aware of their intervention group allocation, participants were asked during followup to guess which condition they thought they participated in (i.e., intervention or control). Participants' responses to this question were not related to actual group allocation ($X^2 = .559$, $p = .46$), indicating that effects of lack of blinding were probably minimal.

Finally, dissemination and implementation research, including that presented here, has been criticized for its bias toward adopting and implementing EBPs,[1] with too little attention to the potential benefits of *not* adopting an EBP. Additional research is needed to understand how and why innovations should be adopted in specific organizational contexts, and under what circumstances it is more beneficial for an organization not to adopt an innovation.

Implications for Behavioral Health

Examination of the effectiveness of dissemination and implementation strategies for the communication of behavioral health evidence to community-based practitioners and organizations is a necessary step in ensuring that community-based behavioral health care practice is based on the best available evidence and best practices. This study focused on one particular EBP, MI; however, the results may be applicable to other EBPs implemented in community-based health settings. Results indicated that both active and passive strategies were effective in increasing awareness and intent to adopt MI. The active strategy was more effective; however, it was also more expensive to implement. Given that cost-benefit analyses are not available to determine if the extra effectiveness is worth the extra cost, individual organizations should determine which strategy would be most useful for them. Dissemination strategies should be informed by the level of training and learning preferences of staff, the varying resources across implementation settings, and the extent to which

staff and the organization may be amenable to change.[54] One strategy alone may not be enough to take into account all these factors; therefore, different strategies may be needed.

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