

Motivational Interviewing Interventions in Graduate Medical Education: A Systematic Review of the Evidence

DAVID DUNHILL, MD
STACIE SCHMIDT, MD
ROBIN KLEIN, MD

Abstract

Background Motivational interviewing (MI) is a patient-centered method of behavior change counseling. It has shown promise in enabling patients to identify and improve problem health behaviors. Incorporating MI education into residency training may be beneficial.

Objective To review the current evidence regarding the impact of MI education in graduate medical education.

Results Of the 9 studies of MI education in graduate medical education training, most noted favorable outcomes after MI education. Outcomes included improvements in residents' view of MI, MI skill use and competency, and resident satisfaction with MI interventions. Of the 5 studies that looked at residents' views of MI, 3 found improvements in resident assessments of the importance of and confidence in using MI. Of the 4 studies of MI skills, 3 reported

improvements in residents' use of and competency in the MI skill. The quality of MI education in the graduate medical education literature is limited by overreliance on preintervention and postintervention analysis as a study design, the variable intensity of educational interventions, and limited use of validated assessment tools and quantitative outcome measures.

Conclusions Review of the literature shows that MI education can be successfully implemented within the residency education environment. The intensity of MI interventions, coupled with experiential learning and feedback, correlated with favorable outcomes in terms of resident use of MI skills and resident satisfaction. Further study is needed to determine which MI skills are most effectively taught to residents, the impact of MI training on resident behavior in clinical settings, and the impact on clinical outcomes.

Introduction

Motivational interviewing (MI) is a cognitive behavioral method for enabling patient-centered behavior change.¹ Central to MI is acknowledging patients' motivation and autonomy to change behavior. Using MI, clinicians help patients identify problem behaviors, explore motivation and ambivalence to change, develop solutions, and set goals.^{1,2} MI uses specific principles, such as empathy,

dealing with resistance, developing discrepancy between problem behaviors and goals, and supporting self-efficacy to change.

Evidence shows that MI is beneficial in dealing with a range of chronic diseases and problem behaviors. In 2 independent meta-analyses of 72 studies, MI was found to have positive effects on patient health behavior outcomes.^{3,4} It has been shown to be effective in dealing with problem health behaviors, including alcohol abuse,^{5,6} smoking cessation,⁷ and drug abuse.^{8,9} MI has been shown to enable patients to make improvements in blood pressure,¹⁰ weight loss,^{11,12} and physical activity scores,¹³ and it has also been shown to promote medical adherence in patients with human immunodeficiency virus¹⁴ and asthma.¹⁵

Incorporating MI training into residency training may be useful. We reviewed the literature on MI education in graduate medical education training.

Methods

We performed a systematic review of the literature designed to capture relevant primary studies for inclusion in our review. The search strategy was based on the PRISMA (Preferred Reporting Items for Systematic

All authors are at Emory University School of Medicine. **David Dunhill, MD**, is Resident, Department of Internal Medicine; **Stacie Schmidt, MD**, is Assistant Professor, Division of General Medicine, Department of Internal Medicine; and **Robin Klein, MD**, is Assistant Professor, Division of General Medicine, Department of Internal Medicine.

The authors would like to thank Dominique Cosco, MD, Division of General Medicine, Department of Internal Medicine, Emory University School of Medicine.

Funding: The authors report no funding source for this study.

Conflict of interest: The authors declare they have no competing interests.

Corresponding author: Robin Klein, MD, Emory University School of Medicine, Division of General Medicine, 49 Jesse Hill Jr Drive, Atlanta, GA 30303, rklein3@emory.edu

Received March 28, 2013; revision received August 21, 2013; accepted November 25, 2013.

DOI: <http://dx.doi.org/10.4300/JGME-D-13-00124.1>

TABLE 1 CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS

Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Abramowitz et al (2010) ¹⁶	Postintervention analysis	30 primary care internal medicine residents	Longitudinal curriculum with modules during ambulatory blocks in the second and third years	Open-ended questions, affirmations, reflective listening, and summarizing (OARS); a typical day; ask-tell-ask; pros and cons; importance and confidence scales; agenda setting; and action plans	Case-based instruction, videotapes, role play, experiential learning, direct observation with feedback, and modeling during clinic	Serial resident evaluations during the curriculum Focus group feedback with faculty members	Increased confidence in assisting patients in health behavior change, increased awareness of barriers to change, and improved patient-physician collaboration	Pilot study Detailed description of curriculum and MI content	Postintervention analysis only No control group Limited to observational reporting No quantitative data or statistical analysis reported Did not use a validated assessment tool Outcome measures limited to resident perceptions Reporting bias due to use of resident self-reporting Did not address effect on skills, behaviors, or patient outcomes
Triana et al (2012) ¹⁷	Preintervention-postintervention analysis	39 family medicine residents	4-week block rotation focused on MI	Reflective listening, assessing importance, "rolling with resistance," and emphasizing autonomy and personal choice	Workshops, role play, SPs, direct observation of patient encounters in clinic with feedback, independent study, wellness project	Resident self-reported importance and confidence scales using preintervention-postintervention testing Faculty observation of resident use of MI in role play, SP encounters, and continuity clinic patient interactions	Increase in resident self-reported importance and confidence with using MI after the rotation Observed that residents demonstrated competency in MI skills Subjective reports of high resident satisfaction with the rotation	Outcomes assessed skills	Use of historical controls Limited to observational reporting Did not report resident survey data or skill competency data No statistical analysis reported Did not use a validated assessment tool Reporting bias due to use of resident self-reporting Did not address effect on behaviors or patient outcomes

TABLE 1 CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS (CONTINUED)

Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Johns et al (2010) ¹⁸	Preintervention-postintervention survey analysis	25 family medicine residents and 15 family medicine faculty members participated (full data on 25; partial data on 33)	2.5-hour symposium	Open-ended questions, affirmations, reflective listening, and summarizing (OARS); "rolling resistance"; expressing empathy; developing discrepancy and supporting self-efficacy (REDS); and confidence scales	Didactics and videotape demonstrations	Pretraining and 3-month posttraining survey modified from previously reported survey	Significant increase in knowledge of smoking cessation guidelines ($P < .001$) No significant difference in frequency of counseling, provision of cessation resources, or development of cessation plans No difference in assessment of importance of counseling or comfort level in providing counseling for smoking cessation	Good response rate Outcomes assessed behaviors	Included both residents and faculty Use of historical controls Reporting bias due to use of resident self-reporting Did not address effect on patient outcomes
Scal et al (2004) ¹⁹	Preintervention-postintervention analysis	46 pediatrics and internal medicine pediatrics participants in a training program (full survey data on 32 and partial data on 38)	3-hour symposium followed by a 1-hour booster session 6 weeks later	NR	Presentations, case discussion, role play, and supporting material	Pretest and posttest using a 39-item, forced-answer questionnaire	Significant increase in confidence in ability to counsel, frequency of counseling, use of MI components and assessment of patients' views of the importance of and patients' confidence to change No change in the residents' views of the importance of and effectiveness of counseling	Multiple specialties involved Outcomes assessed behaviors Development of assessment tool reported	Use of historical controls Reporting bias due to use of resident self-reporting of data Did not address effect on patient outcomes Limited detail in MI content and methods

TABLE 1 CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS (CONTINUED)

Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Childers et al (2012) ²⁰	Preintervention-postintervention analysis	19 third-year internal medicine residents	4 half-day sessions over 4 weeks (12 hours total) Built on previous training in medical interviewing and informed decision making	Open-ended questions, affirmations, reflective listening, and summarizing (OARS); change talk; "rolling with resistance"; and goal setting	Methods include didactics, video exercises, written exercises, role play, and simulated patient exercises	Helpful Responses Questionnaire preintervention and postintervention to assess resident's use of MI techniques for each of 6 vignettes Skills included open-ended questions, closed-ended questions, frequency of reflections, MI road blocks, and use of MI-consistent statements Scoring was blind and independent Resident surveys assessed the importance of confidence and confidence in counseling and satisfaction with the curriculum	Significant increases in resident's use of open-ended questions (1.97 to 1.05, $P = .02$), use of reflections (1.87 to 4.87, $P < .001$), and use of MI strategies (0.45 to 0.97, $P = .02$) Significant decrease in use of closed-ended questions (1.13 to 0.37, $P = .04$) and MI road blocks (4.00 to 1.08, $P = .02$) Residents rated the importance of counseling and confidence in ability to counsel patients higher after the curriculum Mean overall curriculum score was 8.3 out of 10 The simulated patient encounter was the highest rated element	Use of validated assessment tool Outcome measures assessed skills	Small sample size Use of historical controls Reporting bias due to use of resident self-reporting Did not address effect on patient outcomes

TABLE 1 CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS (CONTINUED)

Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Lozano et al (2010) ²¹	Randomized controlled trial	18 pediatrics residents Randomized Wait-list group used as control	Two 4.5-hour MI workshops Three-station OSCE at baseline, 3 months, and 7 months with written feedback after the 3-month OSCE	Open-ended questions, affirmations, reflective listening, and summarizing	Interactive presentations, demonstrations, videotapes, skills practice, OSCE with written feedback	OSCE scored using Motivational Interviewing Treatment Integrity (MITI 2.0) scale to assess MI behaviors, style, and spirit Determined the percentage of MI-consistent behavior (%MICO score) Used linear regression to control for baseline and assess training effects	Intervention group showed a trend toward increased skill (%MICO score) at 3 months At 7 months, significant increase in skill (%MICO score) change from baseline of 16% to 20%, $P < .02$ across all OSCE stations. At 3 and 7 months, MI spirit ratings increased more in the intervention group than the control group	Randomized controlled trial Use of validated assessment tool Outcome measures assessed skills via OSCE Wait-list group used as control to reduce selection bias	Small sample size High rate of refusal to participate (38%) due to lack of interest or time 2 lost to follow-up Did not address effect on patient outcomes
Cole et al (2012) ²²	Postintervention analysis	8 family medicine residents	3-hour MI workshop followed by 8-station OSCE	NR	Didactics and direct observation with feedback in an OSCE format	Faculty evaluated MI skills during OSCE to assess specific MI skills and overall MI competency Residents evaluated the curriculum	3 residents showed marked improvement during the OSCE and 5 showed no improvements Faculty rated residents highest in exploring patients efforts to change (mean 4.0) and lowest in use of decisional balance in the pros and cons of behavior (mean 2.66) Residents rated the OSCE and faculty feedback highly (7/5 and 9/4, respectively)	Outcome measures assessed skills via OSCE No control group Very small sample size Limited to informal, observational reporting No statistical analysis reported Did not discuss the validity of the assessment tool Did not address effect on patient outcomes Limited detail in MI content and methods	

CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS (CONTINUED)

Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Burton et al (201) ²³	Postintervention analysis	77 residents (44 internal medicine and 33 pediatrics residents)	3-hour workshop during ambulatory blocks	Open-ended questions, affirmations, reflective listening, and summarizing (OARS); assessing readiness for change; change talk; and goal setting	Didactics, video exercises, taped standard patient encounters, and role play with feedback	Postworkshop evaluation with written comments by residents	Overall rating of 3.5 (4-point Likert scale) for the workshop From written comments, the residents enjoyed the role-play exercise with real-time feedback, audiovisuals, interactive activities, and supporting materials	Large sample size Multiple specialties included	Postintervention analysis only No control group Limited reporting of evaluation data No statistical analysis reported Did not use a validated assessment tool Outcome measures limited to workshop evaluation data Reporting bias due to use of resident self-reporting Did not address effect on skills, behaviors, or patient outcomes Selection bias as residents elected to participate in the workshop Did not report data on behaviors or attitudes

CHARACTERISTICS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS (CONTINUED)									
Study	Study Type	Resident Population and Setting	Education Intervention	MI Skills	Methods	Measurement Tool	Outcomes	Strengths	Limitations
Yu and Beresford (2010) ²⁴	Preintervention-postintervention analysis	6 postgraduate year-2 family medicine residents	Two half-day workshops on MI and patient self-management	NR	Direct observation of goal setting in clinic and review of monthly individual performance reports	Team reviewed resident charts to develop performance reports that detailed performance in diabetes process measures, clinical measures, and documentation of self-management support strategies	Increase in residents demonstrating self-management support strategies (0% to 100%) and patient use of self-management support strategies (6.7% to 56.2%) Improvement in clinical outcomes, including percentage achieving blood pressure, low-density lipoprotein, and hemoglobin A1c goals (5.7% to 17.1%) Improvement in diabetes-related process measures	Outcome assessed by patient chart review	Very small sample size Limited evaluation data (5 of 6 residents) No control group Multiple other interventions confound the impact of MI teaching Limited reporting of resident evaluation data No statistical analysis reported Limited detail in MI content and methods

Abbreviations: MI, motivational interviewing; SP, standardized patient; OSCE, objective structured clinical examination; NR, not reported.

Reviews and Meta-analyses) guidelines.²⁵ We conducted a comprehensive search of the MEDLINE and Embase databases. The original search was performed in September 2012, and a verification search was performed in January 2013.

We combined 2 search themes, MI and graduate medical education, as Medical Subject Headings (MeSH). MI was captured using the terms *motivational interviewing*, *motivation*, *directive counseling*, *self-efficacy*, *self-care*, and *self-management*. Graduate medical education was captured using the terms *graduate medical education* and *medical education, graduate*. The Boolean operator AND was used to combine MeSH terms, and asterisks were used to capture multiple forms of a word. Limits were set to only include studies with human subjects, those in English, and those published from January 1990 to September 2012.

We devised a 3-tiered review process. After initial capture, article titles were screened by reviewers for inclusion in the study. Following this step, both titles and abstracts were assessed to identify articles for an in-depth review, and the full text of selected articles was reviewed independently by 2 reviewers for inclusion. References of captured articles were reviewed for additional relevant articles.

We included studies that described an MI educational intervention incorporated into a graduate medical education training environment. For inclusion, the intervention must have been identified as including MI skills, and the learner population must have included trainees in a graduate medical education training program. Data were extracted from full-text articles and compiled by 2 authors independently. We assessed study type, learner population, MI content, teaching methods, assessment methods, and outcomes. We assessed limitations of the studies individually and in aggregate. Disagreements were settled by discussion and third-party review.

Results

The structured search strategy yielded 9 unique studies meeting the inclusion criteria.^{16–24} TABLE 1 displays details extracted from the studies, and TABLE 2 includes strengths and limitations of the studies. Five studies were preintervention and postintervention studies, 3 were postintervention studies, and 1 study was a randomized controlled trial. The 9 studies included a total of 268 participants. Four were set in family practice, 3 in internal medicine training programs, 3 in pediatrics, and 1 in a combined internal medicine-pediatrics program.

Interventions incorporated training in various MI skills. In 4 studies, training included general MI principles and

techniques.^{16,17,20,21} In 5 studies, the MI intervention was focused on a specific disease or health behavior, including smoking cessation,^{18,19} alcohol abuse,²² obesity,²³ and diabetes mellitus.²⁴ Multidisciplinary teams were used to design and implement interventions in all studies. Team members included behavior medicine specialists, psychologists, MI specialists, and clinicians.

The education interventions varied across studies. A few studies reported a discrete intervention, such as a single workshop,^{18,22,23} whereas others described more intensive MI interventions, including multiple sessions within a communication curriculum,²⁰ a dedicated MI rotation,¹⁷ and a longitudinal MI curriculum.¹⁶

Content of the interventions was mixed. The most commonly taught MI skills (in 3 or more studies) were reflective listening, open-ended questions, affirmations, summarizing, “rolling with resistance” (ie, adapting to patient resistance rather than opposing it), “change talk” (ie, using the patient’s own words/desire for change), and goal setting. A range of teaching methods were used, including case-based discussion and video demonstration. Most interventions used skills practice with feedback via resident role play, standardized patient exercises, direct observation in clinic, and objective structured clinical examination (OSCE).^{16,17,19–24} Three studies observed residents engaging in MI during actual patient encounters.^{16,17,24}

Assessment and outcomes varied across studies. Most studies used preintervention and postintervention testing to assess the impact of the intervention on residents’ view of the importance of and confidence with behavior change counseling.^{16–20} Residents’ MI skill use and competency were assessed via direct observation in clinic,¹⁷ a validated survey tool,²⁰ and the OSCE format.^{21,22} One study looked at documentation of counseling activities and clinical endpoints from patient medical records.²⁴ Resident satisfaction with the educational intervention was assessed via survey and feedback.^{17,20,22,23}

Resident Views of Health Behavior Change Counseling

A number of studies assessed the impact of teaching MI skills on residents’ views of the importance of and confidence with behavior change counseling.^{16–20} Abramowitz et al¹⁶ described a longitudinal intervention where MI training was incorporated in ambulatory blocks in the second and third years of residency. It incorporated training in many MI skills and provided skills practice opportunities, including direct observation and modeling with faculty in clinic. With this training, residents reported increased confidence in assisting patients in health behavior change, awareness of barriers to change, and sense of patient-physician collaboration.

STRENGTHS AND LIMITATIONS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS ^a									
Study	Design	Setting	Type of Data	Validity of Evaluative Tool	Analysis	Outcome Measures	Strengths	Limitations	
Abramowitz et al (2010) ¹⁶	Postintervention analysis	Single specialty, single institution, response rate not reported	Assessment by study participants via survey and focus group	NR	Limited to observational reporting Descriptive analysis only No statistical analysis reported	Attitudes, perceptions, and general facts	Pilot study Detailed description of curriculum and MI content	Postintervention analysis only No control group Limited to observational reporting No quantitative data or statistical analysis reported Did not use a validated assessment tool	
Triana et al (2012) ¹⁷	Preintervention-postintervention analysis	Single specialty, single institution, response rate not reported	Assessment by study participants via survey Assessment of participants via faculty observation	NR	Limited to observational reporting Descriptive analysis only No statistical analysis reported	Attitudes, perceptions, and general facts Skills	Outcomes assessed skills	Use of historical controls Limited to observational reporting Did not report resident survey data or skill competency data No statistical analysis reported Did not use a validated assessment tool	
Johns et al (2010) ¹⁸	Preintervention-postintervention analysis	Single specialty, residents and faculty, single institution, response rate 82.5% to 62.5%	Assessment by study participants via survey	Modified from previously published survey	Quantitative data with appropriate statistical analysis reported	Attitudes, perceptions, and general facts Behaviors	Good response rate Outcomes assessed behaviors	Included both residents and faculty Use of historical controls Reporting bias due to use of resident self-reporting Did not address effect on patient outcomes	

STRENGTHS AND LIMITATIONS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS^a (CONTINUED)

Study	Design	Setting	Type of Data	Validity of Evaluative Tool	Analysis	Outcome Measures	Strengths	Limitations
Scal (2004) ¹⁹	Preintervention-postintervention analysis	2 specialties, single institution, response rate 82.6% to 69.6%	Assessment by study participants via survey	Reported, developed by MI-trained faculty based on literature Reliability measures reported	Quantitative data with appropriate statistical analysis reported	Attitudes, perceptions, and general facts Behaviors	Multiple specialties involved Outcomes assessed behaviors Development of assessment tool reported	Use of historical controls Reporting bias due to use of resident self-reporting of data Did not address effect on patient outcomes Limited detail in MI content and methods
Childers et al (2012) ²⁰	Preintervention-postintervention analysis	Single specialty, single institution, response rate 100%	Assessment by study participants via survey	Reported, used Helpful Responses Questionnaire Reliability measures reported	Quantitative data with appropriate statistical analysis reported	Attitudes, perceptions, and general facts Skills	Use of validated assessment tool Outcome measures assessed skills	Small sample size Use of historical controls Reporting bias due to use of resident self-reporting Did not address effect on patient outcomes
Lozano et al (2010) ²¹	Randomized controlled trial	Single specialty, single institution, response rate 88%	Assessment via OSCE	Reported, used Motivational Interviewing Treatment Integrity (MITI 2.0) scale Reliability measures reported	Quantitative data with appropriate statistical analysis reported	Attitudes, perceptions, and general facts Skills	Randomized controlled trial Use of validated assessment tool Outcome measures assessed skills via OSCE Wait-list group used as control to reduce selection bias	Small sample size High rate of refusal to participate (38%) due to lack of interest or time 2 lost to follow-up Did not address effect on patient outcomes

STRENGTHS AND LIMITATIONS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS ^a (CONTINUED)								
Study	Design	Setting	Type of Data	Validity of Evaluative Tool	Analysis	Outcome Measures	Strengths	Limitations
Cole et al (2012) ²²	Postintervention analysis	Single specialty, single institution, response rate not reported	Assessment of participants via OSCE Assessment by study participants via survey	NR	Limited to observational reporting Descriptive analysis only No statistical analysis reported	Attitudes, perceptions, general facts Skills	Outcome measures assessed skills via OSCE	Postintervention analysis only No control group Very small sample size Limited to informal, observational reporting No statistical analysis reported Did not discuss the validity of the assessment tool Did not address effect on patient outcomes Limited detail in MI content and methods
Burton et al (2011) ²³	Postintervention analysis	2 specialties, single institution, response rate 92%	Assessment by study participants via survey	Reported, derived from previously used evaluation tool, not validated	Limited quantitative data Descriptive analysis only No statistical analysis reported	Attitudes, perceptions, and general facts	Large sample size Multiple specialties included	Postintervention analysis only No control group Limited reporting of evaluation data No statistical analysis reported Did not use a validated assessment tool Outcome measures limited to workshop evaluation data Reporting bias due to use of resident self-reporting Did not address effect on skills, behaviors, or patient outcomes Selection bias as residents elected to participate in the workshop Did not report data on behaviors or attitudes

STRENGTHS AND LIMITATIONS OF STUDIES OF TEACHING MOTIVATIONAL INTERVIEWING TO MEDICAL RESIDENTS^a (CONTINUED)

Study	Design	Setting	Type of Data	Validity of Evaluative Tool	Analysis	Outcome Measures	Strengths	Limitations
Yu and Beresford (2010) ²⁴	Preintervention and postintervention analysis	Single specialty, single institution, response rate 83%	Assessment of participants via chart review and reports Assessment by participants via survey and focus group Patient outcome measures	NR	Limited quantitative data Descriptive analysis only and no statistical analysis reported	Attitudes, perceptions, and general facts Behaviors Patient outcomes	Patient outcomes assessed via chart review	Very small sample size Limited evaluation data (5 of 6 residents) No control group Multiple other interventions confound the impact of MI teaching Limited reporting of resident evaluation data No statistical analysis reported Limited detail in MI content and methods

Abbreviations: NR, not reported; MI, motivational interviewing; OSCE, Objective Structured Clinical Examination.

^a Study domains listed based on the Medical Education Research Study Quality Instrument (MERSQI) domains.²⁶

Triana et al¹⁷ described 39 family medicine residents who underwent a 4-week dedicated MI rotation. Experiential learning methods included role play, standardized patients, and direct observation of patient encounters in clinic. Residents also engaged in independent projects where each resident initiated his or her own self-directed health behavior change process in order to emulate the patient experience. Residents' views of the importance of and confidence with using MI skills increased after this rotation.

Scal et al¹⁹ incorporated MI skills within a smoking cessation program targeted to 46 pediatrics and internal medicine-pediatrics residents. Residents participated in a 3-hour symposium focused on MI skills that included case presentations, discussion, and role play followed by a 1-hour booster session held 6 weeks later. Participants reported a significant increase in confidence in their ability to counsel, frequency of counseling, and use of MI skills, but there was no change in residents' perception of the importance or effectiveness of counseling.

In a study of family practice residents and faculty, Johns et al used a single 2 1/2-hour symposium that incorporated MI skills as related to smoking cessation.¹⁸ A survey 3 months later found a significant increase in knowledge of smoking cessation guidelines but no change in perception of the importance of counseling or comfort level in providing counseling. There was no difference in frequency of counseling, provision of cessation resources, or development of cessation plans.

MI Skill Use and Competency

Four studies assessed the impact of an MI intervention on residents' skill use and competency.^{17,20-22} In a study of 19 postgraduate year-3 internal medicine residents, Childers et al²⁰ studied the effect of an MI intervention on residents' use of specific MI skills using the Helpful Responses Questionnaire. Residents participated in 4 MI sessions over 4 weeks that included both didactics and skills practice via role play and simulated patient exercises. The MI training led to increases in residents' use of open-ended questions (1.97 to 1.05, $P = .02$), use of reflections (1.87 to 4.87, $P < .001$), and use of MI strategies (0.45 to 0.97, $P = .02$) as well as decreases in use of close-ended questions (1.13 to 0.37, $P = .04$) and MI road blocks (4.00 to 1.08, $P = .02$).

In a randomized controlled study of 18 pediatrics residents, Lozano et al²¹ studied the impact of MI training on resident skills using serial OSCEs. Residents participated in two 4 1/2-hour workshops focused on MI skills followed by a 3-station OSCE at baseline, 3 months, and 7 months. The OSCEs were scored using the MI Treatment Integrity (MITI 2.0) scale, which assesses MI spirit and behavior; outcome measures were reported as the percentage of MI

consistent behavior (%MICO). Compared with controls, MI skill significantly increased (change from baseline %MICO score of 16% to 20%, $P < .02$) at 7 months.

In a study of 8 family medicine residents, Cole et al²² used a single 3-hour MI workshop followed by an 8-station OSCE to assess residents' MI skills related to alcohol abuse. Only 3 residents (37.5%) showed marked improvement during the OSCE. Residents rated highest in exploring patients' efforts to change (mean score of 4.0 on a 4-point scale) and lowest in use of decisional balance in the pros and cons of behavior (mean score of 2.66 on a 4-point scale).

Triana et al¹⁷ reported that residents demonstrated competency in MI skills after participating in an MI-focused block. An objective assessment of skill use or competency was not provided.

Resident Satisfaction

In a large study of 77 medicine and pediatrics residents, Burton et al²³ described a 3-hour workshop focused on MI skills related to obesity counseling incorporated into the ambulatory block. A variety of methods were used, including didactics, video exercises, standard patient encounters, and role play with feedback. Residents rated the workshop highly (mean score of 3.5 on a 4-point scale) and appreciated the role-play exercise, real-time feedback, audiovisuals, and interactive activities.

Similarly, residents rated the curriculum of Childers et al²⁰ highly (mean score of 8.3 on a 10-point scale) and the simulated patient encounter rated highest. Cole et al²² reported that residents rated the OSCE exercise (mean score of 7.5 on a 10-point scale) and faculty feedback highly (mean score of 9.4 on a 10-point scale). Triana et al¹⁷ reported high satisfaction with an MI-focused rotation.

Clinical Outcomes

In a small study of 6 family medicine residents, Yu and Beresford²⁴ described MI education as a component of a multifaceted approach to managing patients in a diabetes clinic. The MI component included 2 half-day workshops on MI skills and self-management strategies. Residents participated in direct observation of goal setting with patients and received regular reports of their documentation of self-management support strategies. Other simultaneous interventions included diabetes training, monthly performance reports in diabetes metrics, decision support tools, treatment protocols, and diabetes registry. In aggregate, the interventions led to an increase in documentation of self-management support (0% to 100%) by residents and improvements in clinical outcomes, including achieving blood pressure, low density lipoprotein, and hemoglobin A1c goals (5.7% to 17.1%).

Discussion

Although there were noted differences across studies, most studies in this review noted favorable outcomes after MI education implementation, including improvements in residents' view of MI, MI skill use and competency, and satisfaction with MI educational interventions. Benefits were seen in different resident populations and using both general and disease-specific scenarios.

Successful interventions included 2 key elements, an intensive curriculum and interactive skills practice methods, which combined to yield favorable outcomes.^{16,17,20,21,23,24} Interventions lacking 1 or both of these components were comparatively less successful.^{18,19,22} Intensive training interventions included those that had an in-depth curriculum, were delivered over time, taught multiple MI skills, and used mixed teaching methods.^{16,17,20} Another important aspect of MI interventions was experiential learning and feedback. Experiential learning opportunities allowed residents to practice specific MI skills, and direct feedback provided residents with situation-based assessment, criticism, encouragement, and suggestions. These experiences were implemented by many successful programs in the form of role play, standardized patient exercises, and direct observation of residents in clinic and in OSCE. Opportunities to practice skills were rated highly by participants.^{20,22,23}

The most appropriate content to include in an MI curriculum is difficult to ascertain. Curricula that focused on general MI principles and skills demonstrated stronger outcomes with regards to MI education than those related to a specific disease or health behavior.^{16,17,20,21} This may be due to the intensity of the curriculum and interactive methods. Only 1 study assessed the adoption of individual MI skills by residents.²⁰ Heterogeneity in the detail used to describe each intervention's content makes it difficult to determine if teaching certain skills correlates with stronger outcomes. Future study is needed to determine which specific MI skills are most effectively taught, perceived as valuable, and adopted for use by resident learners.

Looking at specific outcomes, the evidence suggests that teaching MI had a positive impact on residents' views of the importance of and confidence with behavior change counseling.¹⁶⁻²⁰ Of the 5 studies that looked at this outcome, 3 found that MI training increased residents' estimation of the importance of and confidence with behavior change counseling. In the 2 studies that showed either no impact or mixed results, use of a limited intervention likely blunted impact.

The literature on MI skill use and competency has the strongest evidence. Of the 4 studies that assessed MI skill use, 3 reported improvements in residents' use of MI skills

and mastery of those skills. The highest-quality evidence comes from the study by Lozano et al,²¹ which used a randomized controlled design, validated assessment tool, longitudinal assessment period, and quantitative outcome measure. Although the small statistically significant improvement (16% to 20%) leads to doubts about the practical significance of the MI intervention, it was measured 7 months after a 2-session educational intervention. A more intensive intervention with serial doses of the intervention over time may yield a greater impact. Likewise, in the 1 study that failed to show an impact in MI skill use, the use of an isolated intervention likely limited effectiveness. Although 1 study documented MI skill competency via direct observation in clinic, there is no objective evidence of residents' use of MI skills with patients. Further investigation is needed to determine the impact of educational interventions on residents' behavior in real-world clinical settings.

In terms of clinical outcomes, the evidence is limited. Although Yu and Beresford²⁴ reported improvements in clinical outcomes, multiple interventions were implemented concurrent with the MI curriculum. Further study is needed to determine the impact of MI interventions on clinical outcomes.

The feasibility of incorporating an MI curriculum is an important point. Developing an MI intervention requires an investment in terms of time, expertise, and cost. Replicating this in programs without faculty experienced in MI may be challenging. However, MI training and resources are readily available to those who are interested and motivated. In all of the studies, multidisciplinary teams were used to design and implement the curricula. Of the few that reported on the time and effort required, Childers et al²⁰ noted 0.1 full-time equivalent reserved for implementing this curriculum, and Cole et al²² noted 2 hours of preparation time for a team of 8 to execute a 3-hour workshop and OSCE.

An MI curriculum seems well suited to specialties in which trainees regularly engage in health behavior counseling in their interactions with patients, making MI a useful tool in chronic care or a patient-centered medical home. MI training is a means of addressing the core competencies of patient care and interpersonal and communication skills.²⁷ In 2 studies, the MI educational intervention was associated with the self-management component of the chronic care model.^{16,24} Self-management support encourages patients' participation in managing their medical conditions and engaging in healthy behaviors.^{28,29} Also, MI is a useful adjunct to self-management as it helps providers identify behaviors, cope with resistance, and set goals using a patient-centered approach.

The review has several limitations. Heterogeneity across studies in terms of sample size, methodology, MI

content, assessment tools, and outcomes made direct comparisons difficult. There was an overreliance on preintervention and postintervention analysis. Variability in detail used in describing the MI interventions makes comparison difficult. A few studies were limited by the very small sample size, and some relied on self-referral for participation, raising concerns about selection bias. Most studies did not use validated assessment tools, and some relied on subjective reporting of outcomes.

Conclusion

Our review suggests that MI education can be successfully implemented within a graduate medical education training program and that MI training can improve residents' views of MI and use of MI skills. The intensity of intervention coupled with experiential learning with feedback appears to correlate with improved outcomes. Further study is needed to determine which specific MI skills are most effectively taught to residents, the impact of MI training on residents' behavior in real-world clinical settings, and impact on clinical outcomes.

References

- 1 Miller WR, Rollnick S. *Motivational Interviewing: Preparing People for Change*. New York, NY: Guilford Press; 2002.
- 2 Rollnick S, Miller WR. What is motivational interviewing? *Behav Cogn Psychother*. 1995;23:325–334.
- 3 Rubak S. Motivational interviewing: a systematic review and meta-analysis. *Br J Gen Pract*. 2005;55(513):305–312.
- 4 Hettema J, Steele J, Miller WR. Motivational interviewing. *Annu Rev Clin Psychol*. 2005;1:91–111.
- 5 Brown JM, Miller WR. Impact of motivational interviewing on participation and outcome in residential alcoholism treatment. *Psychol Addict Behav*. 1993;7:211–218.
- 6 Project MATCH Research Group. Matching alcoholism treatments to client heterogeneity: Project MATCH three-year drinking outcomes. *Alcohol Clin Exp Res*. 1998;23:1300–1311.
- 7 Butler CC, Rollnick S, Cohen D, Russel I, Bachmann M, Stott N. Motivational consulting versus brief advice for smokers in general practice: a randomised trial. *Br J Gen Pract*. 1999;49:611–616.
- 8 Saunders B, Wilkinson C, Phillips M. The impact of a brief motivational intervention with opiate users attending a methadone programme. *Addiction*. 1995;90:415–424.
- 9 Stephens RS, Roffman RA, Curtin L. Comparison of extended versus brief treatments for marijuana use. *J Consult Clin Psychol*. 2000;68(5):898–908.
- 10 Woollard J, Beilin L, Lord T, Puddey I, MacAdam D, Rouse I. A controlled trial of nurse counseling on lifestyle change for hypertensives treated in general practice: preliminary results. *Clin Exp Pharmacol Physiol*. 1995;22(6–7):466–468.
- 11 Pollack KI, Alexander SC, Coffman CJ, Tulsy JA, Lyna P, Dolor RJ, et al. Physician communication techniques and weight loss in adults: Project CHAT. *Am J Prev Med*. 2010;39(4):321–328.
- 12 Webber KH, Tate DF, Quintilliani LM. Motivational interviewing in Internet groups: a pilot study for weight loss. *J Am Diet Assoc*. 2008;108(6):1029–1032.
- 13 Harland J, White M, Drinkwater C, Chinn D, Farr L, Howel D. The Newcastle exercise project: a randomized controlled trial of methods to promote physical activity in primary care. *BMJ*. 1999;319(7213):828–831.
- 14 Holstad MM, Dilorio C, Resnicow K, Sharma S. Group motivational interviewing to promote adherence to antiretroviral medications and risk reduction behaviors in HIV infected women. *AIDS Behav*. 2011;15(5):885–896.
- 15 Schmalings KB, Blume AW, Afari N. A randomised controlled pilot study of motivational interviewing to change attitudes about adherence to medications for asthma. *J Clin Psychol Med Settings*. 2001;8:167–172.

- 16 Abramowitz SA, Flattery D, Franses K, Berry L. Linking a motivational interviewing curriculum to the chronic care model. *J Gen Intern Med*. 2010;25(suppl 4):620–626.
- 17 Triana AC, Olson MM, Trevino DB. A new paradigm for teaching behavior change: implications for residency training in family medicine and psychiatry. *BMC Med Educ*. 2012;12(1):64.
- 18 Johns TL, Lawrence E, Martini LE, Dunn GE, Thompson ZJ, Zwygart K. Smoking cessation in family medicine: effects of an area health education center training program. *J Grad Med Educ*. 2010;2(2):283–288.
- 19 Scal P, Hennrikus D, Ehrlich L, Ireland M, Borowsky I. Preparing residents to counsel about smoking. *Clin Pediatr (Phila)*. 2004;43(8):703–708.
- 20 Childers JW, Bost JE, Kraemer KL, Cluss PA, Spagnoletti CL, Gonzaga AM, et al. Giving residents tools to talk about behavior change: a motivational interviewing curriculum description and evaluation. *Patient Educ Couns*. 2012;89(2):281–287.
- 21 Lozano P, McPhillips HA, Hartzler B, Robertson AS, Runkle C, Scholz KA, et al. Randomized trial of teaching brief motivational interviewing to pediatric trainees to promote healthy behaviors in families. *Arch Pediatr Adolesc Med*. 2010;164(6):561–566.
- 22 Cole B, Clark DC, Seale JP, Shellenberger S, Lyme A, Johnson JA, et al. Reinventing the reel: an innovative approach to resident skill-building in motivational interviewing for brief intervention. *Subst Abus*. 2012;33(3):278–281.
- 23 Burton AM, Agne AA, Lehr SM, Davis NJ, Willett LL, Cherrington AL. Training residents in obesity counseling: incorporating principles of motivational interviewing to enhance patient centeredness. *J Grad Med Educ*. 2011;3(3):408–411.
- 24 Yu GC, Beresford R. Implementation of a chronic illness model for diabetes care in a family medicine residency program. *J Gen Intern Med*. 2010;25(suppl 4):615–619.
- 25 Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med*. 2009;151(4):264–269.
- 26 Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. *JAMA*. 2007;298(9):1002–1009.
- 27 Kaplan S, Elliot H. Using motivational interviewing to meet core competencies in psychiatric residency training. *Acad Psychiatry*. 2011;35(1):46–50.
- 28 Lorig KR, Holman H. Self-management education: history, definition, outcomes, and mechanisms. *Ann Behav Med*. 2003;26(1):1–7.
- 29 Mazzuca SA. Does patient education in chronic disease have therapeutic value? *J Chronic Dis*. 1982;35(7):521–529.