

# Motivational Interviewing to Promote Healthy Lifestyle Behaviors: Evidence, Implementation, and Digital Applications

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**Background:** Chronic lifestyle-related diseases, including poor diet, physical inactivity, and smoking, pose a global health challenge. Motivational Interviewing (MI), a client-centered approach, effectively promotes behavior change. This review examines MI's impact on healthy lifestyle behaviors and its implications for healthcare practice and research.

**Methodology:** Relevant studies published between 2015 and 2025 were sourced from PubMed, Google Scholar, and ScienceDirect. Inclusion criteria focused on research evaluating the role of MI in promoting healthy behaviors, while studies unrelated to MI were excluded. The selected literature included diverse study designs assessing both the effectiveness and implementation of MI across various health domains.

**Results:** The evidence shows that MI promotes short-term improvements in diet, physical activity, smoking cessation, and treatment adherence. It encourages healthier eating patterns, greater exercise participation, and higher abstinence rates, while also enhancing engagement in psychological therapies. However, effectiveness is highly dependent on practitioner fidelity and demographic tailoring, with outcomes varying by gender, age, and population needs. Despite promising initial results, long-term benefits often decline due to dropout, logistical challenges, and socioeconomic barriers. Digital and hybrid delivery models offer a potential solution, improving accessibility, scalability, and sustained adherence, and represent an important direction for future implementation.

**Conclusion:** MI is a versatile, evidence-based tool for fostering healthy lifestyle behaviors. Its non-confrontational, autonomy-supportive approach aligns well with diverse clinical and public health contexts. Future research should prioritize scalable digital/hybrid models, strategies for sustained outcomes, and implementation science frameworks to address real-world barriers.

**Keywords:** motivational interviewing, MI, smoking cessation, substance use disorder, telehealth care, chronic diseases

## Introduction

Chronic diseases, or noncommunicable diseases (NCDs), are the world's most pressing health challenge, accounting for 75% of global deaths, approximately 43 million lives lost annually.<sup>1</sup> The four deadliest NCDs—cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes are driven by shared, modifiable risk factors such as tobacco use, unhealthy dietary habits, physical inactivity, excessive alcohol consumption, and obesity. Healthy lifestyle behaviors therefore include protective factors eg balanced nutrition, regular physical activity, tobacco and alcohol avoidance, weight management, adequate sleep, and stress control which collectively lower NCD risk. These factors contribute to more than two-thirds of chronic disease cases worldwide. In the United States, 60% of adults live with at least one chronic condition and 40% with multiple comorbidities.<sup>2</sup>

Globally, lifestyle risks remain high: the WHO reports 1.3 billion tobacco users, 1.9 billion overweight adults (650 million obese), and over one in four adults physically inactive, with the steepest increases in low- and middle-income countries (LMICs). The rise of NCDs is further intertwined with social determinants of health, including limited access to nutritious food, safe recreational spaces, and affordable healthcare. Rural communities face added barriers such as physician shortages and hospital closures, creating cycles in which poverty and poor health reinforce one another.<sup>3</sup>

Modifiable risks like smoking and inactivity often progress to hypertension, diabetes, and obesity that are major drivers of NCD-related illness and death. Tobacco alone causes 480,000 deaths annually in the US, while poor diets and sedentary lifestyles fuel diabetes and cardiovascular disease. These risks interact and compound, underscoring the importance of early, multi-behavior interventions.<sup>4</sup> Obesity triggers diabetes, worsening heart disease, and smoking damages both lungs and circulation. These interconnected risks create a compounding effect, making prevention and early intervention crucial to reducing chronic disease burdens.<sup>5</sup>

Motivational Interviewing (MI), developed by Miller and Rollnick, is a client-centered, directive method that strengthens intrinsic motivation by resolving ambivalence. Unlike traditional didactic approaches that instruct patients what to do, MI emphasizes collaboration, empathy, and autonomy, encouraging individuals to articulate their own reasons for change. Its advantages include adaptability across behaviors, effectiveness in diverse populations, and potential for digital and telehealth delivery. Looking ahead, MI's purpose extends beyond clinical encounters, offering scalable integration into mobile health, telemedicine, and AI-driven platforms. Core principles include empathy, autonomy support, developing discrepancy, and “rolling with resistance”, with four key phases: engaging, focusing, evoking, and planning.<sup>6</sup>

In the broader context of behavior change, MI complements yet differs from frameworks such as the transtheoretical model, which categorizes readiness to change, or behavioral economics, which relies on external incentives. MI's unique strength lies in fostering intrinsic, sustainable motivation, making it well suited for long-term lifestyle modification.

This review is timely given the post-COVID surge in telehealth and digital health tools, coupled with global calls for scalable interventions to address the escalating burden of lifestyle-related NCDs. Therefore, this paper evaluates the application, effectiveness, and implementation of MI in promoting healthy lifestyle behaviors, providing evidence-based insights for healthcare practice and highlighting gaps for future research.

## Methodology

This narrative review examined studies published between 2015–2025 through comprehensive searches of PubMed, PubMed Central, Google Scholar, and ScienceDirect. Inclusion criteria focused on peer-reviewed publications comprising 50 studies that explicitly employed MI as a primary intervention with measurable behavioral outcomes (eg, changes in diet, physical activity, or substance use). Exclusion criteria removed non-empirical studies (eg, commentaries, editorials) and articles without accessible full texts, resulting in a curated selection of randomized controlled trials (RCTs) and meta-analyses. The search employed key terms including MI and dietary adherence, “nutrition counseling”, “exercise adherence”, “physical activity promotion”, “MI and tobacco cessation”, “MI and alcohol reduction”, “MI and substance use disorder”, “telehealth motivational interviewing”, and “MI fidelity and implementation” targeting studies that evaluated MI's effectiveness in facilitating sustainable behavior change across smoking cessation, physical activity, dietary modifications, and chronic disease management.

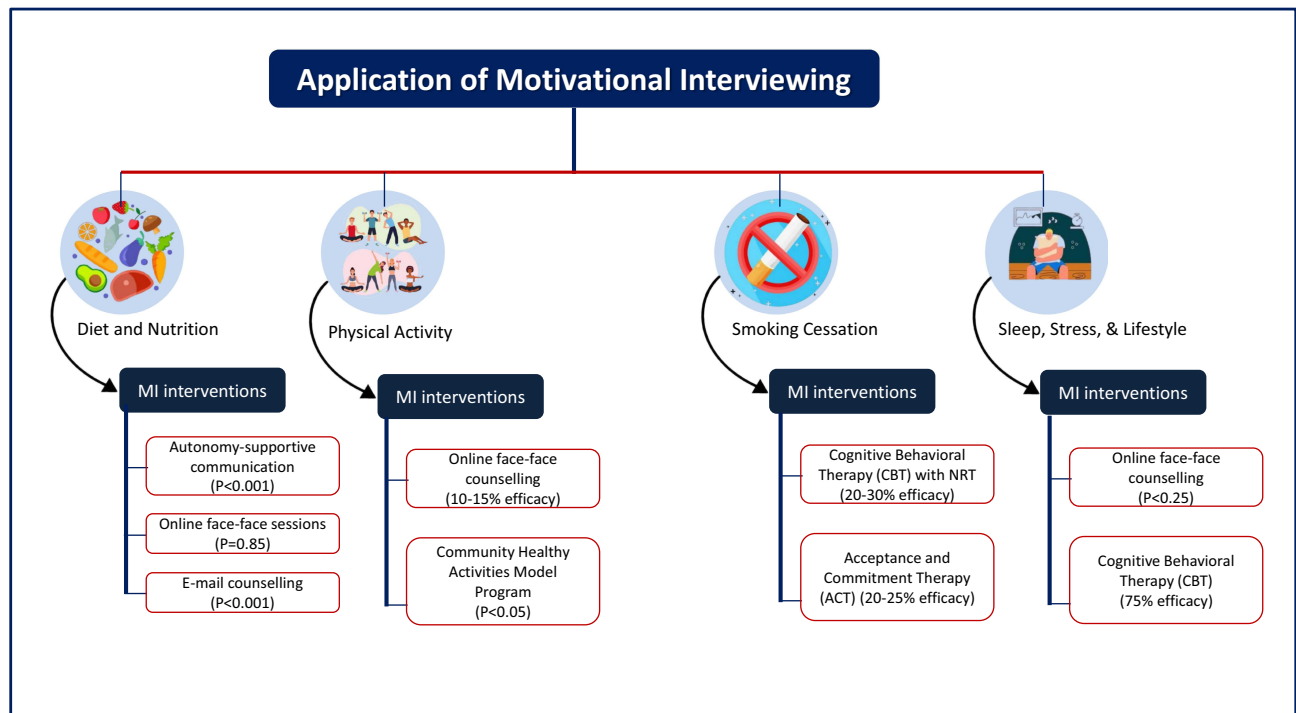
## Results and Discussion

### Applications for MI

#### Diet and Nutrition

According to a report, less than 50% of US adults follow dietary recommendations. MI plays a crucial role in promoting healthy eating by enhancing intrinsic motivation and resolving ambivalence toward dietary changes, particularly in managing serum cholesterol—a key factor in cardiovascular health (Figure 1). MI enhances dietary adherence in cholesterol management by eliciting “change talk” helping patients articulate personal reasons for heart-healthy eating (eg, reducing saturated fat) and aligning changes with their values (eg, family health). Instead of lecturing, MI explores ambivalence, addresses barriers (eg, knowledge gaps), reinforces autonomy, competence (eg, highlighting past successes), and personal relevance, making dietary shifts feel achievable.<sup>1,7</sup>

Webber et al found that MI interviewing by online face-to-face session correlated with greater weight loss ( $r = 0.51$ ,  $P < 0.05$ ) and led to an average reduction of 225 kcal/day ( $P = 0.85$ )<sup>2</sup> (Figure 1). Resnicow et al highlighted the importance of MI tailored health communication and Self-Determination Theory (SDT), demonstrating that while overall



**Figure 1** Application of MI across various health domains.

fruit and vegetable (F&V) intake improved similarly across groups, autonomy-supportive communication, rooted in MI and SDT, was particularly effective for individuals who preferred it, increasing their F&V consumption by 1.07 servings compared to 0.43 in controls. Additionally, age played a moderating role, with older adults in the MI/SDT group showing greater improvements (1.09 servings) than controls (0.48), is consistent with other MI/SDT trials reporting 30–50% larger effect sizes in older cohorts. This strongly supports the strategic tailoring of MI by age to maximize public health impact.<sup>3,4</sup>

In addition, several trials have shown promise in achieving sustained dietary improvements. A Ugandan RCT found that a 12-week MI-based program increased daily fruit and vegetable intake six-fold (OR = 6.31) and added ~156 min/week of moderate activity ( $p = 0.025$ ).<sup>5</sup> Alexander et al showed that MI-based interventions including online untailed program plus MI-based counseling via e-mail at 3-, 6- and 12-months follow-up duration led to a significant increase in fruit and vegetable consumption (mean difference: 4.4 servings/day,  $p < 0.001$ ),<sup>6</sup> and reduced saturated fat and sugar intake ( $p < 0.001$ ).<sup>7</sup> However, such impressive gains are often achieved under controlled trial conditions, and their real-world applicability remains uncertain, as food choices are shaped by affordability, availability, and cultural environments rather than motivation alone. Dietary relapse is common, and evidence beyond 12 months for sustained MI effects on diet is weak and inconsistent.<sup>8</sup>

Real-world adoption may be strengthened by embedding such interventions within accessible community or health-care structures, combining motivational content with structural supports (eg, subsidies or improved food access).<sup>9</sup> Additionally, pragmatic, adaptive piloting should guide scaling to ensure interventions remain feasible, acceptable, and impactful in diverse real-world environments.<sup>10</sup> Furthermore, MI may be more effective in encouraging relatively simple dietary changes (eg, adding fruits and vegetables) than in supporting complex and demanding restructuring (eg, long-term adherence to low-sodium or low-fat diets in heart failure patients).

### Physical Activity

MI effectively supports physical activity initiation and maintenance by fostering intrinsic motivation and resolving ambivalence (Figure 1). Using core techniques—open-ended questions, reflective listening, and collaborative goal-setting—MI helps individuals overcome barriers like time constraints, low confidence, and lack of social support. By

aligning exercise with personal values, MI reframes physical activity as a meaningful choice rather than an obligation, boosting commitment.<sup>11,12</sup> Hardcastle et al found that MI counseling including physical exercise, walk significantly increased participants' walking duration (mean difference: 30 min/week;  $p=0.006$ ,  $d=0.24$ ) and 33.68% reduced BMI over six months, with the effect size ( $d=0.24$ ).<sup>9</sup>

Similarly, Bennett et al demonstrated that MI interventions including (Community Healthy Activities Model Program for Seniors questionnaire) and improving aerobic fitness (6-minute walk), health (Medical Outcomes Study Short-Form 36), and fatigue (Schwartz Cancer Fatigue Scale) in cancer survivors doubled weekly caloric expenditure ( $p<0.05$ ) among cancer survivors, with particularly strong effects observed in participants who reported high baseline self-efficacy ( $p<0.05$ ) (Figure 1).<sup>13</sup> Notably, an 8-week MI-integrated cardiac rehabilitation program for post-myocardial infarction patients demonstrated significant improvements in both physical activity levels (53.5 vs 36.8 min/day of moderate-to-vigorous activity,  $P=0.030$ ) and cardiorespiratory fitness (mean VO<sub>2</sub> max difference: 2.8 mL/kg/min;  $P=0.001$ ) compared to standard rehabilitation. The observed 2.8 mL/kg/min improvement in VO<sub>2</sub> max (maximal oxygen uptake during intense exercise) was particularly clinically meaningful, as prior research shows each 1 mL/kg/min increase in cardiorespiratory fitness corresponds to approximately 10–15% reduction in cardiovascular mortality. However, the absence of long-term follow-up data (beyond 6–12 months) represents a critical knowledge gap.<sup>12</sup> Evidence from non-Western regions is also scant, although the Ugandan study mentioned above similarly showed a substantial decrease in sedentary time (−43.9 min/day; 95% CI: −87.8 to −0.1;  $p=0.049$ ),<sup>6</sup> suggesting MI's promise in diverse sociocultural settings.

### Smoking Cessation

MI is an evidence-based smoking cessation intervention (Figure 1), either standalone or combined with Nicotine Replacement Therapy (NRT) and Cognitive-Behavioral Therapy (CBT). While NRT addresses withdrawal and CBT targets behavioral triggers, MI complements both by resolving ambivalence and enhancing intrinsic motivation through empathetic, patient-centered dialogue. Research shows that brief to moderate-intensity MI (1–2 sessions over 6 months) can increase abstinence rates by 20–30% at both 3 and 6–12 months, reduce cigarette use among persistent smokers, and improve readiness to quit without significant adverse effects (Figure 1). Similarly, Lindson-Hawley et al found that MI, delivered in one to six clinician-led sessions lasting 10 to 60 minutes over six months, significantly improved smoking cessation rates (RR = 1.26) across various settings, including primary care, hospitals, communities, phone lines, and military services without causing adverse effects. Notably, even very brief sessions under 20 minutes were highly effective (RR = 1.69, 9 trials; N = 3,651). Both single-session (RR = 1.26) and multi-session MI (RR = 1.20) interventions outperformed control conditions.<sup>14</sup>

Beyond MI, third-wave therapies like Acceptance and Commitment Therapy (ACT) complement MI by targeting psychological flexibility and values-driven action rather than ambivalence resolution (Figure 1). While MI alone achieves modest quit rates (~20–25%), combining MI with ACT may improve outcomes, particularly for smokers with low distress tolerance, by addressing avoidance patterns and enhancing values alignment.<sup>15</sup> Bricker et al. Comparing web-based ACT combined with brief MI support to standard MI. Participants using WebQuit.org spent significantly more time per login on the site (18.98 vs 10.72 minutes;  $p=0.001$ ) and reported greater satisfaction (74% vs 42%;  $p=0.002$ ). At the 3-month follow-up, a higher proportion of participants in the WebQuit.org group had successfully quit smoking (23% vs 10%; OR = 3.05; 95% CI: 1.01–9.32;  $p=0.050$ ). Notably, 80% of this treatment effect was mediated by ACT-based increases in acceptance of physical, cognitive, and emotional cues to smoke.<sup>16</sup> While these findings demonstrate MI's promise as a scalable tool, the evidence base is heavily weighted toward North American and European cohorts. A meta-analysis of 28 trials (N = 16,803) found that MI increased quit rates with a relative risk (RR) of 1.26 (95% CI: 1.16–1.36), and short sessions (<20 min) were particularly effective (RR = 1.69; 95% CI: 1.34–2.12).<sup>17</sup> This underscores the need for studies in other regions where smoking motivations and cultural contexts may substantially differ.

### Sleep, Stress, and Lifestyle Factors

MI applications in sleep, stress, and lifestyle are also included in Figure 1. MI has shown promise in enhancing sleep hygiene, stress management, and screen time reduction by fostering intrinsic motivation and self-efficacy. However, the

evidence base for MI in mental health applications is significantly smaller, less robust, and more preliminary compared to its use in substance use or smoking cessation.

For instance, Simpson and Zuckoff conducted a case study involving six individuals with a mean age of 51.2 years, all diagnosed with obsessive-compulsive disorder (OCD). They found that pre-treatment MI introductory sessions lasting 15 minutes over 3 months helped participants engage more effectively in subsequent CBT or pharmacotherapy.<sup>18</sup>

Similarly, Westra and Dozois found that incorporating three 20-minute MI counseling sessions over 3 months, in addition to CBT for individuals with panic disorder, generalized anxiety disorder, or social phobia, significantly improved outcomes compared to CBT alone. Specifically, the MI+CBT group showed greater homework compliance ( $p < 0.05$ ) and a higher proportion of treatment responders (75% vs 50%,  $p = 0.02$ ), without reporting any side effects (Figure 1).<sup>19</sup>

Another study revealed that three 15-minute MI counseling sessions, followed by a 12-month follow-up, were more effective in reducing OCD symptoms than exposure and response prevention (ERP). Many patients experience only partial recovery, while others refuse treatment or drop out ( $p < 0.25$ ).<sup>20</sup> Meta-analyses and systematic reviews show MI effects on core psychiatric symptoms (depression, anxiety, OCD) are smaller and less consistent. In trials of chronic-disease self-care and some cancer populations MI has been linked to small improvements in depressive symptoms, but pooled estimates for depression/anxiety are mixed.<sup>21</sup> However, MI pretreatment increases likelihood of attending subsequent therapy and completing exposure/ERP or CBT modules. When dropout or low adherence limits the impact of a disorder-specific therapy, MI added before or early in treatment increases the dose of the active therapy that patients actually receive.<sup>22</sup>

These findings suggest that MI may serve as a valuable adjunct to standard treatments such as CBT and ERP, particularly for individuals with anxiety and OCD. However, as most studies have originated from the US and Europe, evidence on MI's efficacy in non-Western cultural contexts remains limited, highlighting an important gap for future global research.

## MI Across Populations and Settings

### Adolescents and Young Adults

MI has demonstrated efficacy in promoting behavior change among adolescents and young adults, particularly in addressing substance use, enhancing academic engagement, and supporting mental health outcomes. A study by Grenard et al, found that brief, one-on-one online MI sessions—incorporating personalized feedback comparing participants' substance use to normative data—reduced alcohol consumption by 25% among adolescents (ages 13–18) and young adults (ages 19–25).<sup>23</sup> Naar-King et al reported high satisfaction among youth receiving antiretroviral therapy who participated in a computer-based MI intervention. A greater reduction in viral load were observed for the intervention group compared to controls at 6 months, with a higher percentage achieving undetectable viral loads by 6 months.<sup>24</sup> Additionally, a meta-analysis by Berhan & Berhan found MI reduced risky sexual behaviors by 40% among 15–19-year-olds and 51% among 20–24-year-olds.<sup>25</sup>

In another study, Miller et al examined the efficacy of four clinic-based sessions integrating MI with cognitive-behavioral strategies, delivered by trained healthcare providers over a three-month period. These sessions were conducted among young people aged 16–24 living with HIV (85% behaviorally infected). Session content specifically targeted medication adherence, risk reduction behaviors, and mental health support, with individualized counseling to address participant-specific barriers to care. The findings demonstrate statistically significant improvements in viral load suppression at the 6-month follow-up compared to standard care controls ( $p < 0.05$ ). However, two critical limitations emerged: (1) the therapeutic benefits were not maintained at the 9-month assessment, suggesting waning intervention effects, and (2) only 50% of participants completed the full intervention protocol.<sup>26</sup>

While most MI research has focused on youth and young adults, emerging evidence also supports its efficacy in older adult populations, though studies are fewer in number. Lundahl et al included adults with average age of 46 years across the lifespan in their meta-analysis and found that MI counseling for 6 months with 20–30 minutes long sessions was effective in promoting behavior change across various health domains, including medication adherence, substance use, and chronic disease management, conditions highly relevant to older adults (Figure 1) The average effect size across

studies was small to moderate (Cohen's  $d \approx 0.28$ – $0.40$ ), comparable to those observed in younger populations.<sup>27</sup> Overall, MI has shown consistent effectiveness across age groups in supporting behavior change, especially in substance use, mental health, and medication adherence. Though its effects may diminish over time or vary with intervention fidelity, evidence supports its adaptability from adolescence to older adulthood.

### Chronic Illness Patients

MI improves self-management in chronic conditions by fostering patient empowerment. In a study by Welch et al, participants received an average of 3.4 out of four sessions combining MI with diabetes self-management education (DSME), yet dropout reached 35% at follow-up.<sup>28</sup> This is concerning given the serious complications of NCDs such as renal failure, neuropathy, stroke, and myocardial infarction that make sustained lifestyle change essential.<sup>29</sup> Dropout often stems from logistical barriers (time, transportation, competing priorities) and psychosocial factors (low motivation, frustration with slow progress, or discomfort with introspection) (Figure 1).

Comparisons suggest dropout rates in MI programs (25–40%) are generally similar to those in CBT and standard health education, though MI may improve retention when paired with group support or ongoing follow-ups.<sup>30</sup> However, another study reported that up to 10 MI sessions over 12 months may not be sufficient to sustain blood pressure by an average of 8 mmHg improvements achieved during the initial intervention, as even 10 calls over 12 months equate to less than one session per month.<sup>31</sup>

Evidence for MI's long-term efficacy is mixed, particularly for complex behaviors like weight management. A meta-analysis of 23 RCTs found that while MI initially promoted weight loss, the effect was not sustained at 12-month follow-up ( $-0.30$  kg, 95% CI:  $-1.09$  to  $0.49$ ,  $p=0.46$ ) compared to controls.<sup>32</sup> This variability is often linked to the "MI fidelity paradox", where outcomes depend critically on practitioner adherence to the spirit of MI. In one review, only 40% of published MI trials reported monitoring treatment fidelity, and among those that did, a significant portion showed poor adherence to core principles.<sup>33</sup> This suggests that lasting change depends not on having more sessions, but on delivering them with higher fidelity and integrating ongoing support.

Strategies to reduce attrition include flexible delivery (telehealth, mobile platforms), cultural tailoring, booster sessions, and family or peer involvement. Embedding MI into primary care visits can further reduce logistical burden.<sup>34</sup> Implementation science frameworks such as RE-AIM and CFIR offer valuable tools to identify when and why disengagement occurs, by examining factors like reach, adoption, fidelity, and patient readiness.<sup>35</sup> Applying these models to specifically monitor and address MI fidelity can strengthen sustainability and maximize the long-term impact of MI in chronic disease management.

These findings illustrate MI's effectiveness in facilitating short-term behavior change, though long-term sustainability remains a challenge. Future research should explore strategies to enhance intervention adherence and durability of outcomes, with a specific focus on standardizing fidelity measurement and testing hybrid models that combine high-fidelity MI with longer-term maintenance strategies.

### Gender-Specific Differences

MI outcomes frequently vary by gender, reflecting differences in health behaviors and motivational drivers. In alcohol reduction programs, women receiving Intensive MI (IMI) which is a tailored 9-session version, experienced significantly larger reductions in heavy drinking and alcohol-related severity at two- and six-month follow-ups compared to single-session MI, particularly among heavy-drinking women.<sup>36</sup> Similarly, MI interventions for weight management tend to produce more substantial outcomes among women: a review found that around 67% of female-targeted MI intervention groups achieved significant weight or BMI reductions, with longer and more numerous sessions leading to better outcomes.<sup>32</sup> These differences may be attributable to the empathic, autonomy-supportive orientation of MI, which aligns with the heightened salience of weight and body-image concerns, and their stronger engagement in self-monitoring and coping strategies. Furthermore, the predominance of female participants in many trial samples and the inclusion of intervention components emphasizing relational and psychosocial processes may further accentuate these sex-specific effects.<sup>37</sup>

Conversely, men have shown stronger responses in MI-based smoking cessation programs, with higher 12-month quit rates (28% vs 21%).<sup>14</sup> These gender disparities in MI efficacy may arise from a mixture of biological and psychosocial factors. Women tend to metabolize nicotine differently, which changes withdrawal symptoms.<sup>38</sup> Furthermore, nicotine replacement therapies (patches/gum) often work less well for women, whereas some medications (eg, varenicline) show relatively greater benefit for women.<sup>39</sup> Some studies also shows that women frequently exhibits weight-concern, negative-mood regulation, and stronger cue-triggered craving (smoking in response to social or emotional cues), all of which raise relapse risk.<sup>40,41</sup> These studies suggest that motivational factors and relapse-related drivers are critical considerations in the design of MI interventions. Tailoring session length and structure to accommodate varying motivational profiles and biological needs may enhance intervention fidelity and optimize outcomes across behavioral domains.

### Pregnant Women

MI has been widely adapted to support pregnant women in adopting healthier behaviors, particularly smoking cessation, nutrition, and antenatal care adherence. A meta-analysis found that MI increased the likelihood of smoking abstinence until delivery by approximately 40% compared with usual care.<sup>42</sup> Similarly, MI-based prenatal counseling improved adherence to recommended folic acid supplementation, with uptake rates of 78% in the intervention group versus 62% in controls.<sup>43</sup> Beyond these immediate outcomes, MI has shown promise in enhancing physical activity and healthy eating during pregnancy, contributing to reduced gestational weight gain and better maternal glycemic control.<sup>44</sup>

However, sustaining these behavioral gains postpartum remains a key challenge. High relapse rates into smoking, poor dietary adherence, and declining engagement in physical activity are frequently reported, suggesting that the motivational drivers fueling behavior change during pregnancy may not persist long term.<sup>45</sup> This raises an important mechanistic question: does MI's effectiveness during pregnancy reflect a durable strengthening of intrinsic motivation, or does it largely capitalize on a powerful but time-limited extrinsic motivator, the maternal instinct to protect the fetus. The postpartum "fade effect" indicates that while MI can successfully channel maternal instincts for short-term health gains, it may be less effective at cultivating enduring self-regulation skills and identity-driven motivation needed for long-term maintenance.<sup>26</sup> To address this limitation, researchers have suggested integrating postpartum "booster" sessions to help women reframe motivation from a fetal-centered perspective toward sustainable maternal self-care and identity.<sup>46</sup> Such strategies could strengthen MI's capacity to support lasting behavior change across the perinatal continuum.

## Implementation Considerations for MI Interventions

The effectiveness of MI is significantly influenced by various implementation factors, including delivery modalities, session frequency and duration, provider characteristics, and intervention fidelity (Table 1).

### Delivery Modalities

Traditional in-person MI remains highly effective in clinical settings, particularly for substance use disorders and chronic disease management, as it facilitates deeper therapeutic rapport through nonverbal cues and immediate feedback. However, this approach also presents notable limitations, including limited accessibility for individuals in rural or underserved areas, high resource demands (eg, trained staff, space, and time), and reduced feasibility for ongoing follow-up—especially in low-income or high-need populations. Additional challenges, such as patient no-show rates and therapist availability, can further hinder treatment consistency.<sup>29</sup>

These limitations have driven interest in digital and hybrid MI models to expand access without compromising effectiveness. The increasing adoption of telehealth and digital platforms has significantly improved accessibility, particularly for rural and underserved populations. For example, a randomized controlled trial evaluating a telehealth MI intervention for smoking cessation and physical activity promotion demonstrated superior outcomes compared to standard health education. The intervention group showed greater readiness to quit smoking (19.4%) and higher rates of achieving recommended physical activity levels (81.6%). Notably, nicotine replacement therapy (NRT) use was significantly higher in the intervention group (53.6% vs 28.4%; OR=2.92,  $p<0.001$ ).<sup>47</sup>

**Table 1** Overview of MI Interventions Across Health Conditions

MI Intervention	Reference	Implementation Domain	Study Type	Sample Size	Patient Age	Duration	Intervention Structure	Results
Delivering Modalities								
Telehealth-based MI	Prochaska et al (2025) <sup>47</sup>	Smoking Cessation & Physical Activity	RCT	299	Not Specified	6 months	20 sessions, 20 minutes each	19.4% quit smoking, 81.6% increased physical activity, 53.6% NRT use (OR = 2.92, $p < 0.001$ )
App-based MI (Global Survey)	Cunningham et al (2009) <sup>48</sup>	Alcohol Consumption	Survey	185	46.8 years	6 months	30-minute sessions for 30 days	30% reduction in alcohol consumption
SMS-based MI	Gumede et al (2024)	HIV Medication Adherence (Sub-Saharan Africa)	Systematic Review	538	30–40 years	12 months	20 sessions	65.9% improvement in HIV medication adherence
Intervention Structure								
Injectable naltrexone + behavioral therapy	Osilla et al (2018) <sup>50</sup>	Alcohol Use Disorder (AUD)	RCT	Not specified (42 sessions)	46.2 years	30 days	42 behavioral therapy sessions	Improved outcomes (OR = 0.28, $p = 0.037$ )
Telehealth fitness program	Resnicow et al (2008) <sup>3</sup>	Physical Activity in EU Primary Care	Survey	423	Not Specified	20 days	2 sessions, 20 minutes each	10–25% increased physical activity; 45% remained inactive
MyFitnessPal App + MI engagement	Patel et al (2019) <sup>52</sup>	Weight Loss & Fitness	RCT	105	21–65 years	3 months	20-minute sessions	No significant weight loss difference despite varied engagement
Provider Characteristics								
Non-clinician health coaches using MI	Steinberg et al (2015) <sup>55</sup>	Smoking Cessation	RCT	44	Not Specified	1 month	30 sessions, 45 minutes each	Quit attempts: 34.7% vs 14.3% (OR = 4.39, $p = 0.009$ ); follow-up referrals: 32.7% vs 20.4% (OR = 2.02, $p = 0.157$ )
MI based on Health Belief Model	Parwati et al (2021) <sup>56</sup>	TB Medication Adherence	RCT	107	18–65 years	9 months	Twice-weekly sessions	4.5× greater adherence (ARR = 4.51, $p = 0.018$ ); 3.8× higher treatment success (ARR = 3.81, $p < 0.038$ )
Training & Quality Assurance								
Motivational Enhancement Therapy (MET)	Kramer et al (2019) <sup>58</sup>	Alcohol Consumption	RCT	238	60+ years	26 weeks (follow-up)	423 sessions	27% full MI fidelity, 72% fair, 3% poor; stronger MI spirit than CRA-S, but similar behavioral outcomes
MI-enhanced behavior therapy	Sibley et al (2022) <sup>60</sup>	ADHD Treatment	RCT	278	11–17 years	10 weeks	Daily sessions, 60 minutes	MI-adherent: 78% MET, 77%; Non-adherent: 30% MET, 42% CRA-S; Mean MI fidelity = 0.74
MITI 4.0 (empathy, soft talk) These studies link to training and quality assurance by demonstrating variability in MI fidelity and skill retention, highlighting the need for rigorous training and ongoing supervision to maintain intervention quality.	Moyers et al (2017) <sup>61</sup>	MI Fidelity in ADHD Treatment	RCT	50	Not Specified	Not Specified	10 sessions, 20 minutes each	MI fidelity declined across sessions ( $d = -1.23$ )

The global landscape of MI implementation reflects these technological adaptations. In high-income countries, approximately 60% of substance use programs incorporated virtual MI components post-COVID-19, according to 2022 surveys by SAMHSA and the UK OHID.<sup>48</sup> Digital adaptations have proven particularly impactful with meta-analytic data showing app-based MI interventions associated with 30% reductions in heavy drinking through features like real-time self-monitoring and personalized feedback. Similarly, resource-limited settings have demonstrated successful implementation of mobile health adaptations, with an SMS-based MI intervention in Sub-Saharan Africa showing a 65.9% improvement in HIV medication adherence among 538 participants over 12 months (Table 1).<sup>49</sup>

### Intervention Structure

The frequency, duration, and intensity of MI sessions play a critical role in determining behavioral outcomes. While brief, single-session MI interventions—such as those delivered in emergency room settings—can prompt initial behavior change (eg, reducing substance use or increasing treatment adherence), sustained outcomes typically require three to four sessions, particularly for complex behaviors like smoking cessation or long-term dietary modification. Research suggests that sessions lasting between 20 and 50 minutes are most effective, as longer durations may reduce engagement due to attention span limitations or participant burden.<sup>14</sup>

High-intensity MI (weekly sessions) has proven particularly impactful for severe addiction cases, such as alcohol use disorder (AUD). For instance, a meta-analysis by Osilla et al found that patients receiving one shot of extended-release injectable naltrexone or any combination of at least two additional behavioral therapy, sublingual buprenorphine/naloxone prescriptions, or OAUD-related medical visits within 30 days of their initial behavioral therapy visit significantly improved outcomes for substance use disorders compared to brief interventions (OR=0.28, p=0.037).<sup>50</sup> In contrast, low-intensity MI (one to two sessions) is often sufficient for preventive health measures, such as general wellness promotion or brief physical activity counseling.<sup>11</sup> This adaptability is evident in European health systems, where brief MI interventions in primary care have contributed to a 10–25% increase in physical activity levels, as highlighted in the 2023 EU Health Report. Despite these positive outcomes, physical inactivity remains a significant public health challenge across Europe, with nearly 45% of adults failing to meet WHO activity guidelines. This persistent concern highlights the gap between efficacy and real-world effectiveness. Significant systemic barriers including insufficient funding, limited practitioner training, and sedentary environments limit the population-level impact of individual-focused interventions like MI.<sup>51</sup> Thus, while effective for individuals, MI alone cannot overcome the broader societal drivers of the inactivity crisis.

Furthermore, the relationship between intervention dosage and outcomes is often complex rather than straightforward. For example, in a behavioral intervention study using the MyFitnessPal app, researchers tracked self-monitoring engagement via an API, defining meaningful dietary tracking as logging at least 800 kilocalories daily. Despite variations in engagement intensity, no significant differences in weight loss were observed between groups at 3 months. This suggests that while MI dosage and engagement are important, other factors mediate outcomes, including individual readiness, intervention personalization, and crucially, social determinants of health such as socioeconomic status, food security, and access to safe spaces for physical activity.<sup>1</sup> These external factors can create significant barriers that even a well-delivered intervention may not overcome (Table 1).<sup>2</sup>

To support lifestyle management across the lifecycle, MI should be integrated into a continuum of care with age-appropriate interventions such as school health programs for children, workplace wellness for adults, and chronic disease management for older populations. Sustainability can be strengthened through regular follow-ups, digital tools (apps, wearables, telehealth), and family or peer support. Incorporating MI into routine primary care and preventive screening ensures ongoing reinforcement of healthy behaviors as needs change over time.<sup>52</sup>

### Provider Characteristics

The efficacy of MI interventions is significantly influenced by the type of provider delivering the intervention, with effectiveness varying based on three key factors: professional training, clinical context, and implementation setting. These factors collectively determine the accessibility, cost-effectiveness, and scalability of MI programs across different healthcare systems. Research demonstrates a clear differentiation in provider effectiveness based on intervention

complexity. A meta-analysis revealed that mental health specialists (eg, psychologists) achieve superior outcomes for complex behavioral health cases like addiction treatment. Conversely, general practitioners and nurses demonstrate comparable efficacy to specialists when delivering brief MI interventions targeting lifestyle modifications such as smoking cessation. This tiered effectiveness has informed European healthcare models, where task-shifting MI delivery to primary care providers has successfully expanded program reach while reducing costs, as evidenced by the UK's NHS brief intervention programs.<sup>53</sup>

Three particularly promising models have emerged to address diverse healthcare needs. First, non-clinician health coaches have demonstrated particular value in cost-sensitive settings, achieving comparable outcomes to traditional clinical interventions at reduced costs. Research indicates their MI delivery were significantly more likely to make a quit attempt by the 1-month follow-up (34.7% vs 14.3%;  $OR = 4.39, P = 0.009$ ) after receiving 30 sessions. In addition, 32.7% of those receiving MI followed up on a referral for tobacco dependence treatment (vs 20.4% receiving interactive education;  $OR = 2.02, P = 0.157$ ).<sup>54</sup> Second, community health workers have demonstrated remarkable success in low-resource settings. A prime example is India's MI for TB Adherence program, which combined biweekly home visits with rigorous fidelity monitoring through audio-recorded supervision, significantly improving TB treatment outcomes. Compared to the control group, the intervention group showed 4.5 times greater medication adherence ( $ARR = 4.51, p = 0.018$ ) and 3.8 times higher treatment success rates ( $ARR = 3.81, p < 0.038$ ) (Table 1).<sup>55</sup>

### Training & Quality Assurance

The effective implementation of MI requires rigorous training protocols and systematic fidelity monitoring to ensure intervention quality. Developing true MI competency typically demands a minimum of 16 hours of structured workshops complemented by supervised practice sessions, with research showing that digital training platforms alone often prove insufficient for cultivating the nuanced interpersonal skills essential to MI's success.<sup>56</sup> These critical competencies - including advanced reflective listening, skillful elicitation of change talk, adaptive responses to resistance, and accurate interpretation of nonverbal cues - fundamentally depend on real-time interactive practice with immediate feedback, elements frequently compromised in asynchronous or purely virtual learning environments.

A Danish study examining 176 recorded MI counseling sessions in primary care settings revealed that only 27% of sessions met all four benchmark scores for good MI fidelity, while 72% achieved fair ratings and 3% completely missed MI standards. This limited full-fidelity achievement has profound implications: it suggests that even when MI is widely implemented, most patients may not receive the full intended benefit, potentially attenuating clinical outcomes such as behavior change or treatment adherence. Notably, Motivational Enhancement Therapy (MET) sessions showed significantly stronger global ratings of MI spirit and relational quality compared to Community Reinforcement Approach with Supportive elements (CRA-S) sessions, though both approaches performed comparably on behavioral metrics such as open questions, complex reflections, and change talk elicitation.<sup>57</sup>

The MI Treatment Integrity coding system (MITI 4.0) is the gold standard for assessing intervention fidelity, offering improved behavioral anchors, streamlined global ratings, and a stronger focus on technical skills while upholding core MI principles. Research shows that programs with regular fidelity monitoring achieve better outcomes. For example, smoking cessation interventions with systematic checks report 50% higher quit rates. Therefore, fidelity gaps like the 73% of sessions not achieving full MI competency highlight the critical need for ongoing supervision, competency-based progression, and blended learning approaches.

Observed clinician behaviors reveal that MI-adherent behaviors (MIAs) appeared in 78% of MET and 77% of CRA-S sessions, while non-adherent behaviors (MINAs) occurred in 30% of MET and 42% of CRA-S sessions. Although these differences were not statistically significant, the relatively high prevalence of MINAs underscores a real-world risk: incomplete fidelity may limit the potency of MI interventions and reduce patient outcomes. When compared to MITI benchmarks for proficient MI, the observed levels of MIAs (Mean: 2.19) remained modest, while MINAs (Mean: 0.74) were higher than ideal.<sup>58</sup> Related research on ADHD treatment adherence presents a contrasting perspective on fidelity dynamics.<sup>59</sup> In a study of 44 community clinicians, treatment adherence declined significantly over ten sessions ( $d = -1.23$ ), particularly in non-office settings and with low parent engagement. Interestingly, higher therapist-reported fidelity correlated with better academic outcomes, whereas MI relational scores showed an unexpected inverse

relationship with family functioning improvements. These findings highlight that measuring MI fidelity in complex, real-world interventions may require more nuanced approaches that account for contextual factors and distinguish between technical adherence and therapeutic relationship quality, emphasizing that gaps in fidelity can profoundly affect intervention effectiveness (Table 1).<sup>60</sup>

## Behavioral and Psychological Outcomes

MI enhances treatment adherence, addiction recovery, and therapeutic engagement while reducing relapse rates, driving short-term motivation and early behavioral changes (eg, reduced substance use in 3–6 months). Psychologically, MI boosts intrinsic motivation, self-efficacy, and emotional well-being while reducing ambivalence, resistance, and symptoms of depression, anxiety, and stress. Its collaborative, empathic approach fosters resilience, self-determination, and coping strategies, improving therapy engagement and relapse prevention in substance use and chronic disease management. However, effectiveness varies by individual differences, intervention duration, and integration with other therapies, necessitating further research on mechanisms and broader applications.<sup>40</sup>

A study evaluating the Motivational Enhancement for Engagement in Treatment (MEET) intervention found that participants who received MEET had nearly twice the odds of being connected to substance use disorder (SUD) treatment compared to those who did not receive the intervention. Specifically, they were more likely to engage in treatment overall (AOR = 1.79) and to do so within 10 days (AOR = 1.65).<sup>61</sup> Another study utilized the Chronic Disease Self-Management Program (CDSMP), in adults with chronic illnesses facilitated the sessions. Program-specific paper-and-pencil assessments were administered before and immediately after the 6-week program. The results showed significant improvements ( $p < 0.01$ ) in self-efficacy, health-related self-efficacy, and self-management behaviors.<sup>62</sup> This choice might reflect limitations such as small sample size, pilot study design, or the goal of detecting early signals of effectiveness in a community-based intervention led by lay facilitators. On the contrary, MI counselling including cardiac rehabilitation program to improve cardiac and psychological health by counselling session to exercise for 30 minutes and diet improvement gave significant results at 6 to 12 months follow-up ( $P=0.812$ ).<sup>63</sup> While MI demonstrates promising behavioral and psychological benefits across various settings, its efficacy depends on proper implementation and individual factors. Future research should refine its application and validate outcomes through rigorous, large-scale studies to maximize its potential.

Theoretical perspectives help explain these outcomes: self-determination theory highlights MI's ability to strengthen autonomy, competence, and relatedness, which underpin sustained motivation, while the transtheoretical model situates MI as a tool to move individuals across stages of change by resolving ambivalence. Linking MI findings to these frameworks clarifies both its successes and its limitations, offering a foundation for tailoring interventions to diverse populations.

## Mi's Distinctive Role Within The Behavior Change Landscape

To maximize MI's potential, structured training programs should be integrated with emerging technologies such as AI-driven MI and telehealth. AI-powered conversational agents or chatbots can provide scalable, real-time support for self-management, offering personalized feedback and reinforcement between sessions. Telehealth platforms can expand access to programs like the Chronic Disease Self-Management Program (CDSMP), enabling remote participation for individuals in underserved or rural areas. Combining these technologies with evidence-based interventions could enhance engagement, adherence, and long-term outcomes while reducing barriers to care.<sup>64</sup>

Positioning MI among behavior change frameworks like CBT, health coaching, and digital nudging reveals its unique role in enhancing adherence and sustaining outcomes through intrinsic motivation. When integrated, MI improves engagement in CBT for depression and anxiety, strengthens commitment to health coaching goals in diabetes care, and makes digital nudges for preventive health more collaborative. However, challenges remain, including the need for cross-disciplinary practitioner training, the inability of MI alone to overcome systemic barriers like poverty or food deserts in obesity management, and a lack of evidence on optimal implementation sequencing.<sup>65</sup>

## Future Directions

Future research should explore hybrid interventions combining MI with cognitive-behavioral strategies, digital health tools, or policy-level changes to enhance scalability and sustainability, as these approaches can support lifestyle management across the entire lifecycle by providing age- and context-appropriate guidance, reinforcing healthy behaviors from childhood through older adulthood, and adapting to changing health needs with scalable digital or policy-based support. Implementation science frameworks, such as RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) and CFIR (Consolidated Framework for Implementation Research), can guide the design and evaluation of these interventions by assessing real-world feasibility, stakeholder engagement, and long-term impact. For example, RE-AIM could evaluate the program's reach among diverse populations, while CFIR could identify contextual barriers (eg, organizational readiness, cost) to scaling up integrated approaches. Embedding these frameworks early in study design will strengthen translational outcomes and inform policy decisions. Moreover, rigorous studies on implementation science, such as optimal session frequency, provider training models, and economic evaluations, will be crucial in establishing MI as a sustainable, evidence-based practice. By addressing these gaps, MI can further solidify its place as a cornerstone of behavioral interventions in both clinical and public health contexts.<sup>66</sup>

## Conclusion

This review highlights that MI is an effective, patient-centered approach for fostering healthy lifestyle changes—such as improved diet, physical activity, and smoking cessation—across diverse populations and settings. Its strength lies in enhancing motivation, autonomy, and self-efficacy, making it adaptable to clinical, community, and digital platforms. However, challenges remain, including maintaining MI fidelity, tailoring interventions to cultural and socioeconomic contexts, and integrating MI with digital health tools. Addressing these barriers through optimized delivery methods and systemic support could expand MI's use in routine practice, reinforcing its role as a key strategy for sustainable behavior change.

## Disclosure

The author reports no conflicts of interest in this work.

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