

The use of motivational interviewing in improving medication adherence for individuals with asthma: a systematic review

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Abstract

Objective: This review was conducted to examine current literature on the use of motivational interviewing (MI) as a strategy to promote individuals with asthma to make behavioral changes and improve health outcomes. This article systematically reviews empirical MI studies which were used to promote asthma medication adherence in children, adolescents, and adults.

Methods: Studies were obtained from several databases. We searched CINAHL, MEDLINE, PsycINFO, PubMed, and Cochrane database for articles on the use of MI to improve asthma medication adherence in individuals diagnosed with moderate to severe asthma. Various combinations of the following search terms were used: motivational interviewing, asthma, medication adherence, medication non-adherence, and MI.

Results: MI intervention showed evidence of improved self-efficacy, asthma, self-management, and positive behavior change for individuals diagnosed with asthma. The results suggest that MI is a feasible and promising approach to improve attitudes toward asthma medication adherence.

Conclusion: The generally favorable results indicate MI merged with other interventions and support is effective in improving medication adherence and is also more sustainable than MI as a stand-alone intervention. Additional research is necessary to assess the effectiveness of MI in ensuring individuals fill their prescriptions and use their medications as recommended.

INTRODUCTION

Asthma is a chronic inflammatory disorder of the respiratory system characterized by periods of reversible airway blockage known as an asthma episode or attack. During an attack, individuals find it extremely difficult to breathe and report symptoms of wheezing, chest tightness, and cough which may result in an emergency department visit, hospitalization, or even death.¹ Although there is no cure for asthma, consistent use of inhaled corticosteroid (ICS) medication has been shown to reduce the likelihood of an asthma attack and improve the quality of life for individuals diagnosed with asthma.²

Asthma remains one of the most common chronic conditions in children, adolescents, and adults. About 1 in 13 people are chronically affected by asthma.³ Individuals with asthma face a unique set of challenges, which increase their risk of engaging in asthma medication

non-adherence. Unique barriers to adherence included poor organizational skills and self-management skills, patients avoiding taking their medication in the presence of their peers, fear of medication side effects, limited understanding and knowledge of health consequences of medication non-adherence, and the tendency for patients to underestimate the gravity of their asthma diagnosis.^{4–6} Furthermore, individuals diagnosed with asthma struggle with lack of control over their health, the inability to participate in other activities like their peers, and feeling unprepared for asthma emergencies.⁶

Medication adherence is generally defined as the extent to which patients take their medications as prescribed by their healthcare providers.⁷ In developed nations, medication non-adherence continues to be a leading public health concern.⁸ About 33% of medication-related hospital admissions in the US are due to poor

The use of motivational interviewing in improving medication adherence for individuals with asthma: a systematic review

medication adherence.⁹ Because medications are being used improperly, an estimated 30%–50% of all prescriptions fail to produce desired results.¹⁰ It has been estimated that over half of chronic disease medications are not taken as prescribed.¹¹ Even after a prescription has been filled, many patients do not take their medication as prescribed. Within a year of being prescribed their medication, over 50% of patients prematurely discontinue their prescribed medication therapy without discussion with their healthcare provider.¹² These patients are more likely to rely on over-the-counter (OTC) epinephrine inhalers which are less effective and shorter acting than prescribed ICS and have been linked to adverse health outcomes.¹³ Over-reliance on OTC inhalers leads to a potentially dangerous situation of patients seeking out OTC medications in an acute situation of respiratory distress, rather than seeking appropriate medical care for an exacerbation, such as visiting their primary care doctor or specialists as needed to manage their symptoms.

Widespread non-adherence has serious consequences for patients and the healthcare systems that serve them. Asthma medication non-adherence compromises effective treatment for individuals diagnosed with this chronic health condition. Medication adherence is crucial to positive health outcomes in individuals diagnosed with asthma. Effective utilization of ICS is one of the most important factors linked to achieving optimal asthma control.¹⁴ ICS remains the preferred treatment for long-term control of symptoms in individuals as they help control narrowing and inflammation of bronchial tubes and should be used daily as part of an asthma treatment plan.¹

Non-adherence to ICS therapy may lead to poor asthma control and increased risk of death. Moreover, asthma medication non-adherence compromises successful management of this chronic health condition and impacts individuals' quality of life while driving up healthcare costs related to asthma. Key findings from an inquest of asthma-related deaths indicated that severe underuse of prescribed asthma inhalers played a key

role in each of the deaths- something which could have been prevented.¹⁵ Adolescents who had one or more asthma attacks in a school year made up a combined 10.5 million days of missed school.¹⁶ Medication non-adherence causes the US to remain the largest consumer of healthcare in the developed world, with healthcare expenses exceeding billions.¹⁷ Per annum, an estimated 2 million patients visit the emergency room (ER) for acute and unscheduled asthma care, which greatly exceeds scheduled asthma care.¹⁷

Before moving forward, it is important to note that non-adherence to asthma medication could be associated with a variety of factors. First, the individual simply might not understand the importance of medication adherence or know the proper technique in using a medication inhaler or tools to better manage and take control of their asthma, also known as *unintentional non-adherence*.⁵ Second, the individual might understand the ramifications of not taking their medications, but because of beliefs and other factors, does not adhere to asthma action/medication plan, also known as *intentional non-adherence*. In the latter case, individuals may simply not weigh their asthma diagnosis as a priority issue in their day-to-day life and as a result fail to take the necessary steps to manage and take control of their asthma, resulting in poor outcomes. In addition, the situation is further complicated when a child or adolescent and his or her caregiver both encounter the above challenges.¹⁸

Significant results of various studies on asthma medication non-adherence in adolescents have indicated that most teenagers struggled to fit taking their medication into their active lives and also struggled to remember to take their medicine especially when there were divergences from their daily routine such as waking up late.^{4–6} Deterrents to medication adherence were competing interests such as spending time with friends, playing video games, texting friends, and sleep.⁵

In a study which examined the prevalence, forms, and consequences of asthma medication non-adherence in adolescents as well as the barriers to

adherence in adolescents diagnosed with asthma, the results indicated a high rate of ICS non-adherence in adolescents, with the rate of asthma medication adherence in adolescents being less than 50%.⁵ Furthermore, adolescents were even less likely to adhere to their prescribed medications after their uncontrolled asthma had led to an ER visit. This led to higher rates of uncontrolled asthma, hospitalization, and mortality in adolescents with asthma.⁶ In a study to identify the predictors of asthma medication non-adherence in adults, the results indicated adults who perceived the severity of their asthma to be low were more likely to frequently skip doses of their ICS medication.¹⁸

Despite the overwhelming published literature addressing the use of behavioral interventions to improve medication adherence, remarkably very little success has been achieved. Motivational interviewing (MI) used in tandem with health education interventions may prove useful in tackling the costly and life-threatening problem of asthma medication non-adherence.¹⁹ MI is defined as a collaborative, goal-centered style of communication designed to strengthen personal motivation for and commitment to a defined goal by eliciting and exploring the individuals own reasons for change within a therapeutic atmosphere of acceptance and compassion.²⁰ This method is a departure from the traditional styles of behavior intervention, which were often aggressive and confrontational. This specific method especially focuses on individuals' intrinsic motivation to change their behavior by helping them set their own goals and recognize discrepancies as it relates to where they are with their current problem behavior and where they would like to be. MI can be practiced and delivered in various mediums, including, but not limited to, in-person (face-to-face) delivery, over the telephone, or online (using electronic software, social media), ultimately resulting in equal success if done correctly. Numerous studies have shown MI to successfully bring about behavior change and improved self-efficacy. MI has traditionally been used in improving behavior change in substance misuse and smoking cessation and has

The use of motivational interviewing in improving medication adherence for individuals with asthma: a systematic review

shown to be useful in other healthcare settings.¹⁹

Patient education is an important part of providing quality healthcare to individuals diagnosed with asthma. A wealth of empirical evidence suggests that patient education and MI increase patient understanding of their chronic health condition and self-management, self-efficacy increases medication compliance leading to less complications, increase patient satisfaction, and reduce ER visits and in-patient admissions.^{21,22} MI builds rapport, communication, and cooperation between the patient and clinician, improving quality of life and functional capacity of the patient through better disease self-management.

This article is a review of recent studies which used MI to improve asthma medication adherence. Our specific objectives were to examine the extent to which available literature addressed the following research questions:

1. How is MI used to improve asthma medication adherence?
2. How effective is MI in improving asthma medication adherence?
3. How effective is MI when used in different settings, to improve asthma medication adherence?
4. What are the implications for future use of MI to improve asthma medication adherence in clinical practice?

The goal of this review was to identify and evaluate the use of MI interventions targeting pediatric, adolescent, and adult individuals with an asthma diagnosis and history of being prescribed long-term asthma medication. This review summarizes results of recent research on MI in improving asthma medication adherence, identifies currently used methodology, and areas where additional research is needed.

METHODS

We completed a systematic review of the literature in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reference standards. The search was

completed between September 2017 and November 2017 using the following electronic databases: CINAHL, MEDLINE, PsycINFO, PubMed, and Cochrane. We used the following search terms: 'MI', 'motivational interviewing', 'asthma', and 'medication non-adherence'. Behavioral studies which did not explicitly use the term 'motivational interviewing' were ineligible for inclusion in this study. In order to be eligible for inclusion in this review, studies had to be focused on MI in accordance with descriptions by the originators of MI, Miller and Rollnick, and address how this behavioral technique could be used to improve asthma medication adherence for individuals diagnosed with asthma. Our review resulted in 11 studies published between 2001 and 2016 that were relevant to our research and that met our eligibility criteria (Figure 1). These 11 articles are summarized in this study.

RESULTS

The studies assessed the effectiveness of MI in improving medication adherence in individuals diagnosed with asthma. We grouped the interventions by the format in which they were delivered to the study participants. The delivery format ranged from traditional MI (in-person sessions) to non-traditional MI (use of interactive MI computer software program without human contact, paper-based questionnaire). See Figures 2, 3, and 4 for study summaries.

Evaluation of efficacy of traditional versus non-traditional MI

In terms of adherence to prescribed asthma medication, traditional MI did not yield significant results in improved asthma medication adherence over a lengthy period of time. Lavoie et al.²³ found participants assigned to MI (3 × 30 min in-person sessions within a 6-week period) had initial significant increases in adherence that tapered off within some time of the intervention ending. Initially, the percentage of ICS refills increased within the MI intervention group; 13% in the MI group versus 6% in the control group. However, 12-month post-intervention analyses revealed a mean change in the

percentage of ICS refills of 11% (MI group) versus 7% in the control group (between group net improvement associated with MI = +3% (-11% to 18%)) representing an effect size (ES) of $d = 0.20$ (medium). On a positive note, in all the studies reviewed, MI intervention participants reported increased self-efficacy and confidence in managing their asthma. In addition, those who were in the traditional MI intervention groups were significantly more likely to engage with their primary care provider and reported increased intention to take ownership of their health. In the case of the Shomaker and DeVeau-Rosen²⁴ study, participants who completed a MI worksheet for facilitating self-management of their asthma noted increased knowledge of asthma and having successfully completed at least one asthma self-management goal.

Assessment of methodological quality of the studies

We performed a structured review of each study from which we entered the pertinent details into a data table. The following aspects were extracted: the number of participants, the study design, details on the MI intervention such as number of sessions and duration, and study outcomes and key findings. In order to assess the quality of the studies we reviewed the objectivity of the measurements, if the study used validated instruments for outcome measurement, and if there was evidence of recall or response bias in outcome reporting.

The study quality varied considerably. Several of the studies had significant methodological strengths such as the use of randomized design and the use of validated instruments to measure adherence as an intervention outcome measure. Nine of the studies used random assignment of participants to the MI intervention and comparison group. Four studies used one or more validated instruments to measure outcomes and limit threats to internal validity. For instance, Foster et al.²⁵ used a SmartTrack device fitted onto participants' inhalers to monitor medication adherence. Similarly,

Figure 1

PRISMA flow diagram detailing study section for literature review on the use of motivational interviewing to improve asthma medication adherence

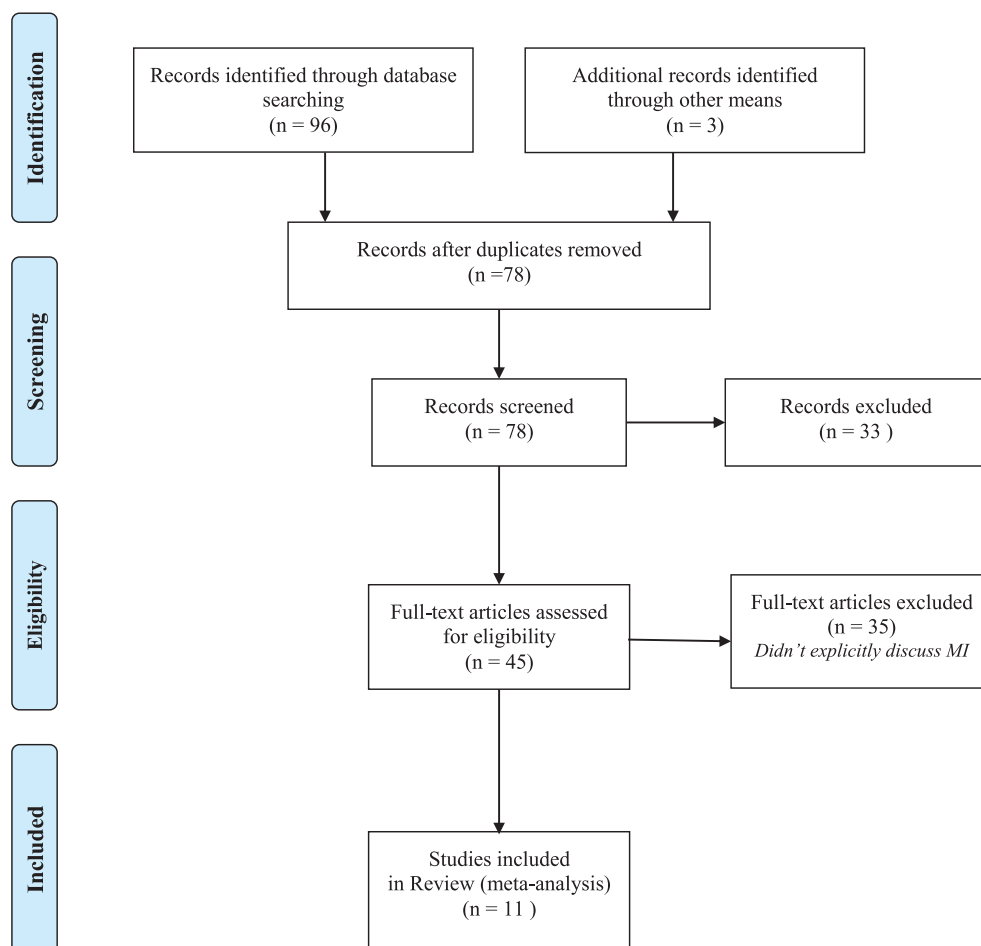


Figure 2

Evaluation of efficacy of traditional versus non-traditional MI: summary of traditional versus non-traditional MI studies per duration, adherence outcome, and clinical outcome and average duration of studies reviewed

Evaluation of efficacy of Traditional vs Non-traditional MI

Style of MI	Duration	Adherence Outcome	Clinical Outcomes
Traditional MI (In-person sessions)	One day to six months	Participants reported increased readiness to change and/or improved medication adherence. There were noted net increases in ICS pharmacy refills	Improved pulmonary function. Reduced asthma exacerbations and decreases in asthma-related symptoms.
Non-traditional MI (Interactive computer software paper based questionnaire)	One day to twelve months	Increase in self- reported medication adherence	Reduction in asthma-related symptoms

Figure 3

Characteristics of traditional MI studies

Study	Study setting	Intervention description	Intervention delivery style (and personnel)	Intervention length	Clinical outcomes	Behavioral Target outcomes
Foster et al. (2014)	GP Clinic	MI	MI supplemented with personalized adherence discussions (PAD) and inhaler reminder (IRF) via text messaging	6 months	No significant improvements in clinical outcomes	Increased medication adherence
Guarnaccia et al. (2016)	GP Clinic	MI	MI supplemented with nutrition, exercise, and emotional well-being health promotion.	1 year	Decreased asthma- related symptoms	No noted improvements in behavioral outcomes
Lavoie et al. (2014)	In-hospital	MI	MI supplemented health promotion discussions	6 weeks	Decreased asthma- related symptoms	Increase in pharmacy refills
Riekert et al. (2011)	At-home visits	MI	MI sessions	8 weeks	No significant improvements in clinical outcomes	improved adherence post-intervention
Seid et al. (2015)	sessions in clinic	MI	MI supplemented with asthma education, problem solving skills training (PSST) and text messaging.	1 month	Noted improvements in clinical outcomes	No noted improvements in behavioral outcomes
Schmaling et al.(2001)	sessions in clinic	MI	MI sessions	2 weeks	Improved pulmonary function	Increased motivation to adhere to medication regimen
Steurer-Stey et al. (2015)	sessions in clinic	MI	MI sessions	3 months	Improvements in clinical outcomes	No increased adherence to asthma self-management

Steurer-Stey et al.²⁶ used peak flow assessments which are a reliable measure of symptom management and medication adherence.

The studies had potential limitations. Nine studies used convenience sampling to recruit study participants. The use of convenience sampling causes some concern as to if the findings are generalizable to differing groups of individuals diagnosed with asthma and prescribed ICS medication. Besides four studies, the remainder of the studies failed to use objective measures of adherence (i.e. electronic medication monitoring) to avoid the issue of reporting bias in adherence reports post-intervention. Instead, they used

self-reported medication adherence or symptom logs. Another issue of concern was the uncertainty surrounding the training and level of expertise of the interventionists providing the MI intervention. The level of expertise of the interventionists varied from a respiratory therapist to graduate students in counseling psychology.^{27,28}

We individually assessed the methodological quality and outcomes of both the traditional and non-traditional MI studies. In regard to better outcomes, traditional MI showed promising results. Non-traditional MI via web-based health education is advantageous as it can reach wide audiences with self-paced delivery that is engaging and convenient.

Because non-traditional MI requires no face-to-face interaction and does not require training staff to apply the technique, it can be used alongside in-person traditional MI to further supplement in-office health education.

There is evidence that MI has been used effectively via telephone to other media link to promote physical exercise, dietary change, tobacco cessation, and blood donation.²⁰ Although research is at a rather early stage, there is some encouraging evidence that MI can be delivered in text formats via printed material or interactive computer software.²⁰ Success has been proven with smoking cessation, sexual risk reduction, depression, and marijuana use.

Figure 4

Characteristics of non-traditional MI studies

Study	Study setting	Intervention description	Intervention delivery style (and personnel)	Intervention length	Clinical outcomes	Behavioral Target outcomes
Halterman et al. (2011)	School & Home	MI	MI counseling sessions (40 min. in-home and over telephone) and direct observation therapy (DOT)	12 months	Decreased asthma-related symptoms	No noted improvements in behavioral outcomes
Joseph et al. (2013)	School	MI	Participants used tailored web based MI program	12 months	No difference in reported symptoms between intervention and control group	No noted improvements in behavioral outcomes
MacDonell et al. (2016)	Clinic	MI	Computer delivered asthma education sessions and text message reminders	6 months	Decreased asthma-related symptoms	Increased medication adherence
Shoemaker et al. (2016)	Clinic	MI	One session with a research assistant reviewing a 12-topic asthma worksheet based on motivational interviewing	1 week	No reported improvement in clinical symptoms	Increased patient self- efficacy. Participants reported being better prepared to self- manage their asthma.

There were notable differences in the duration of participant exposure to the MI intervention. This might explain the variability in outcomes. The duration and format of the MI interventions varied considerably from several in-person 30-min MI sessions over a 4- to 6-week period to one 1-h session with a research assistant reviewing a 12-topic asthma worksheet based on MI techniques. Our review of the studies noted that a longer duration of time exposed to the MI intervention correlated with slight increases in benefits and outcomes.

DISCUSSION

Poor adherence to asthma medication treatment is a dilemma as it decreases the chance of achieving and maintaining proper asthma control, increases ER and hospital stays as a result of uncontrolled asthma attacks, and adds a significant financial burden on the healthcare industry. MI is a highly effective patient-centered technique to evoke patient behavior change.

We examined how MI is used to improve asthma medication adherence,

the various settings in which MI can be used, and implications for future use of MI to improve asthma medication adherence in clinical practice. Our findings also indicated non-traditional use of MI coupled with other interventions/strategies, such as use of social media and web-based applications, was most efficacious. We learned that MI is an effective tool; however, the level of effectiveness varies based on the resources used to implement MI as well as the additional 'non-traditional' resources used to ensure MI is successful.

Findings from our review suggest MI is much more effective when used in tandem with traditional MI. Even though MI failed to produce any long-term discernible advantage across the studies reviewed, the generally favorable outcomes suggest that MI can be used alongside other interventions to improve asthma medication adherence and patient outcomes. MI as a stand-alone method is not efficient, and we recommend MI coupled with other interventions, such as use of technology, ongoing family support/structure, social support, social media support,

incorporation community resources, peer educators, and community healthcare workers. MI can indeed be successful, especially if coupled with other social support resources and technology.

Based on the studies assessed, it is evidenced that a multifaceted approach is necessary in order to effectively improve asthma medication adherence. This multifaceted approach positions high-risk asthma patients with an increased likelihood of managing their asthma by adhering to their asthma action plan and taking their medication regularly to prevent an asthma attack. The MI approach greatly places emphasis on positive reinforcement and operates under the assumption the behavior change will happen in the presence of collaborative relationships. It allows providers to develop a relationship with their patients, not just treat the illness; as a result, the patient's coping mechanisms and self-efficacy for changing high-risk behavior increase because they have a well-supported network of advocates. Therefore, it is paramount for practitioners to perform this method with strong doses of empathy and support.

IMPLICATIONS FOR FUTURE RESEARCH

However, the review's results must be interpreted with caution due to inconsistent methodological quality of the studies. Fortunately, all of the studies had high external validity as they used study participants whom had a medical history of an asthma diagnosis and were currently prescribed asthma ICS medication. Research to date has not

supported success of MI over long periods of time such as 3–5 years or greater. MI encourages patients to play a more active role and be competent managers of their health. MI is ideal for instilling hope, confidence, and action into patients. In that vein, more research should be done in how MI can be used to improve treatment adherence or disease self-care. We recommend a longitudinal study of MI in conjunction

with other supplemental resources, to determine the efficacy of MI in improving asthma medication adherence.

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