

# Complementary and Alternative Medicine for IBS in Adults: Mind-Body Interventions

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## Summary and Introduction

### Summary

Standard treatment for IBS focuses on the management or alleviation of the predominant gastrointestinal presenting symptoms, such as diarrhea or constipation, often using pharmacological therapy. For many patients, this approach is unsatisfactory, and patients frequently seek the advice of complementary and alternative medicine (CAM) practitioners in order to explore other treatment options. CAM practices include a broad range of modalities, and mind-body interventions hold particular promise as treatment modalities for IBS because psychological factors could have an important role in IBS symptomatology and quality of life. Psychological stressors are postulated to result in gastrointestinal symptoms through alteration of intestinal function mediated by the autonomic nervous system, hypothalamic-pituitary-adrenal axis and immune system. Hypnotherapy has the strongest supportive evidence as a beneficial mind-body intervention for IBS. Clinical studies of hypnotherapy have uniformly shown improvement of gastrointestinal symptoms, anxiety, depression and quality of life in patients with IBS. Mindfulness meditation remains unstudied for IBS, but is theoretically attractive as a stress-reduction technique. There is a suggestion that relaxation therapy or multimodal therapy (a combination of relaxation therapy, education and psychotherapy) is beneficial for IBS. The most generally accepted psychological mind-body intervention is cognitive behavioral therapy, and clinical trials support the beneficial effects of cognitive behavioral therapy in patients with IBS.

### Introduction

IBS is a common disorder that affects 14-24% of women and 5-19% of men in Western populations and accounts for 12% of caseloads in primary care.<sup>[1]</sup> In the US, it is estimated that more than 2.2 million prescriptions are written annually for patients with IBS, with medication prescribed during approximately 75% of physician consultations for IBS.<sup>[2,4]</sup> IBS is a chronic disorder that has a marked impact on quality of life. In fact, health-related quality of life has been shown to be lower in patients with IBS compared with patients with other chronic health problems.<sup>[5]</sup> In one large survey of patients with IBS as defined by the Rome I criteria, 34% rated their health as fair to poor, and an average of 30 sick days a year per person was reported.<sup>[6]</sup> Another study, performed in a tertiary care setting, found that 38% of patients with IBS had considered suicide because of their symptoms; a surprising finding that illustrates the degree of distress experienced by patients with this diagnosis.<sup>[7]</sup>

IBS also results in enormous expenditures each year, with annual costs in the US estimated at approximately US\$30 billion, excluding costs of purchasing prescription and over-the-counter medications.<sup>[2,8]</sup> Standard medical treatment for IBS usually attempts to control the patient's symptoms. For example, if a patient predominantly experiences pain, a tricyclic antidepressant

could be prescribed, or, if the patient predominantly suffers from diarrhea, loperamide could be prescribed. Fewer than half of patients with IBS, however, are satisfied with standard medical treatment.<sup>[9,10]</sup>

Given the limitations of standard pharmacological treatments, and the impact of IBS on quality of life, it is not surprising that many patients with IBS turn to alternative medicine. In a population-based study, Koloski *et al.* found that 21% of patients with IBS and/or functional dyspepsia had seen an alternative health-care provider at least once for gastrointestinal problems.<sup>[11]</sup> Another survey ( $n = 1,409$ ), which included outpatients from a gastroenterology clinic and local supermarket customers, found that 50.9% of individuals with IBS used complementary and alternative medicine (CAM).<sup>[12]</sup>

## Complementary and Alternative Medicine

The National Center for Complementary and Alternative Medicine (NCCAM) in the US defines CAM as "a broad domain of medical practices and their accompanying beliefs that are not intrinsic to the dominant health system of a particular society."<sup>[13]</sup> The classification structure developed by NCCAM classifies CAM modalities into several categories. The first category includes whole medical systems, including homeopathy and traditional Chinese medicine. The second category comprises biologically based practices, including herbal remedies and dietary additives. The third category includes manipulative and body-based methods, such as massage and chiropractic and osteopathic manipulation. The fourth category consists of energy therapies, including Qigong, acupuncture, Reiki and magnetic field therapy. Lastly, the fifth category comprises mind-body interventions, which include techniques such as meditation, prayer, relaxation therapy and hypnosis. Cognitive behavioral therapy, which would have been considered CAM in the past, but is now considered mainstream, is also included in this Review. This Review focuses on mind-body interventions in adult IBS; discussion of pediatric IBS management is beyond the scope of this article.

## Mind-body Interventions

Individuals with IBS have increased stress perception, and chronic stress has been shown to affect IBS symptomatology.<sup>[14-17]</sup> The role of psychological stress in IBS can be incorporated into our understanding by using the biopsychosocial model of disease, in which prior life experiences and inherited genetic traits influence how a psychological stressor produces symptoms. A psychological stressor can result in intestinal symptoms by producing changes in intestinal function mediated by the autonomic nervous system, hypothalamic-pituitary-adrenal axis and/or immune system. Higher brain centers can influence this process, through modulation of neural networks involved in brain-gut communication.<sup>[18,19]</sup> This system of higher brain centers has been termed the emotional motor system, and is comprised of the limbic system, medial prefrontal cortex, amygdala and the hypothalamus.<sup>[20]</sup> The emotional motor system transmits emotional changes to the gastrointestinal tract via the pituitary and pontomedullary nuclei, which in turn mediate the neuroendocrine and autonomic nervous system output to the body.<sup>[20]</sup>

Patients with IBS have also been shown to be hypervigilant toward bodily sensations and symptoms.<sup>[18,21,22]</sup> Mind-body interventions intended to reduce stress perception might be a particularly promising category of CAM treatment for IBS, as heightened stress perception and hypervigilance toward bodily sensations and symptoms might represent psychological characteristics that can be modified through mind-body interventions, which could lead to improvement of symptoms and/or quality of life. The remainder of this Review discusses the evidence for the efficacy of mind-body interventions for IBS.

## Hypnotherapy

Hypnosis is defined as the induction of a state of consciousness in which the individual has decreased voluntary action and becomes highly responsive to suggestion or direction. Although Dr Franz Mesmer is often described as the father of hypnotism or 'mesmerism'; the concept of hypnosis can be traced back to the trance-inducing rituals of many ancient cultures including the Greek and Roman empires. The modern concept of hypnotism as a state of suggestibility (i.e. a state of enhanced responsiveness to suggestions and stimuli presented by the hypnotist), rather than one of 'animal magnetism' (i.e. a magnetic 'universal fluid' residing in people that is susceptible to manipulation through trance and the movement of magnets around the individual), and its potential medical benefits were first described by James Braid in the mid 1800s. Hypnotism was used for pain control during surgery before the advent of effective anesthetics and as a treatment for shell shock during World War I.<sup>[23]</sup> In 1955, the British Medical Association commissioned a report on the medical uses of hypnotism.<sup>[23]</sup>

The exploration of hypnotism and its medical uses continues today, with modern, scientific methods being used in an attempt to demystify and further legitimize hypnosis as a therapeutic option. Modern-day hypnotherapy is performed by licensed providers and involves the induction of a trance, deepening of the trance, therapeutic suggestions and then trance termination. Various treatment goals can be met by altering the therapeutic suggestions made while under hypnosis. In the case of IBS, both physiological improvement and psychological improvement have been targeted and studied by hypnotherapists, including the patient's overall quality of life, emotional stressors, bloating, pain and altered bowel habits. It has been argued that there is more evidence to support hypnotherapy than any other treatment modality for severe IBS.<sup>[24]</sup> The efficacy of hypnotherapy for the

treatment of IBS supports the concept that modulation of central nervous system processing of stimuli in patients with IBS can result in alterations in IBS symptomatology.

The mechanism of action of hypnotherapy for the treatment of IBS remains poorly defined. A small number of studies have attempted to define the mechanism of action of hypnotherapy by measuring physiological parameters at baseline and after a course of hypnotherapy. Palsson *et al.* performed barostat testing (to measure rectal pain threshold and smooth muscle tone) in 18 patients, and measured autonomic function (including heart rate, blood pressure, skin conductance, finger temperature and forehead electromyographic activity) in 24 patients, before and after seven sessions of hypnotherapy.<sup>[25]</sup> Although there were large, significant improvements in psychological measures (e.g. somatization and psychological distress), and significant improvement in IBS symptoms (e.g. stool consistency and frequency) after hypnotherapy, other measures including rectal pain thresholds, rectal smooth muscle tone, and autonomic functioning (except skin conductance -- a measure of stress reactivity) were unchanged. The lack of change in physiological measures in this study raises the question of whether hypnosis improves IBS symptomatology by changing a patient's focus of attention or by changing the patient's belief about sensations arising from the gastrointestinal tract. However, the observed change in stool consistency and frequency suggests that changes in physiological measures might have occurred, but were not detected using this study design.<sup>[25]</sup>

In contrast to the report from Palsson *et al.*, other studies have found that the threshold for sensing rectal balloon distension or pain was increased after hypnotherapy.<sup>[26,27]</sup> However, the results of the study by Palsson *et al.* can be interpreted as showing that improvement in the rectal sensitivity threshold is not necessary for IBS symptom improvement following hypnotherapy. Additional studies have focused on the effect of intestinal motor function during hypnosis, and have found that hypnotherapy seems to have a relaxing effect on small-bowel motility and colonic motility.<sup>[28]</sup> Colonic motor function has also been shown to be affected according to the emotional state induced during hypnotherapy, with different colonic motility pressure tracings following the hypnotic induction of excitement, anger, and happiness.<sup>[29]</sup> A change in intestinal motility might, therefore, have a role in the change in symptomatology after hypnotherapy, although this relationship remains poorly studied.

Regardless of the mechanism of action by which hypnotherapy exerts its effect, there is an emerging body of evidence that hypnotherapy is clinically effective for the treatment of IBS.<sup>[30]</sup> Several well-designed studies of hypnotherapy for IBS, including randomized, controlled trials, have now shown substantial long-term improvement not only of gastrointestinal symptoms but also of anxiety, depression, quality of life, disability and excess health-care costs ( [Table 1](#) ).<sup>[24,26,31-37]</sup>

The first study of hypnosis for the treatment of IBS was published in the *Lancet* in 1984 by Whorwell, Prior and Faragher from Manchester, UK.<sup>[31]</sup> In this study, 30 patients with longstanding, refractory IBS symptoms were randomly allocated to undergo either hypnotherapy or a control treatment of supportive psychotherapy plus placebo medication. Patients undergoing hypnotherapy were administered seven 30 min sessions of decreasing frequency over a 3-month period. These patients were also given a tape to use for daily autohypnosis. The control group underwent seven, similarly scheduled 30 min sessions of supportive psychotherapy plus a daily placebo tablet. Daily diary cards were used by both groups to document abdominal distension, abdominal pain and bowel habits. While the control group had some improvement in general well-being, abdominal pain and distension, at 3 months' follow-up, the hypnotherapy group had significantly greater improvement in abdominal pain, distension, bowel dysfunction and general well-being than the control group ( $P < 0.001$ ).<sup>[31]</sup> Another study compared a group of patients with IBS who had undergone hypnotherapy with a group of matched controls, and found that the group who had undergone hypnotherapy had decreased extracolonic symptoms, decreased work absenteeism, and improved quality of life.<sup>[36]</sup> Among patients who initially respond to a course of hypnotherapy, symptomatic benefit has now been shown to last for at least 5 years, as documented in a single long-term follow-up study by Gonsalkorale and colleagues.<sup>[34]</sup>

The methods first elucidated by Whorwell and colleagues are now often referred to as personalized, gut-directed hypnotherapy or the 'Manchester Approach', and have served as the basis for numerous other studies of the effectiveness of hypnotherapy for the treatment of IBS. The Manchester Approach has been described in detail and has undergone some refinement with additional studies performed by the initial group.<sup>[38]</sup> The basics of the Manchester Approach are outlined in [Box 1](#) . An alternative approach to hypnotherapy for the treatment of IBS has been termed the North Carolina Protocol and was first developed by Palsson in collaboration with Whitehead at the University of North Carolina.<sup>[33]</sup> The approach taken by the North Carolina Protocol is outlined in [Box 2](#) .

Groups in Europe and the US have used the Manchester Approach and the North Carolina Protocol in ongoing trials and studies of hypnotherapy for the treatment of patients with IBS. The work of the Manchester group was replicated in the US to determine the acceptability and reproducibility of their results in a US population. In this study, 82% of the treatment patients had improvement of their symptoms, with 27% becoming symptom free.<sup>[37]</sup> Although the evidence in support of hypnotherapy for IBS is compelling, barriers to widespread implementation of hypnotherapy include the added expense of multiple hypnotherapy consultations and the limited number of clinicians qualified to conduct hypnotherapy sessions.<sup>[39]</sup> Given the limited availability and time-intensive nature of hypnotherapy, and given the frequency with which IBS is seen in clinical practice, hypnotherapy is generally reserved for patients who do not respond to standard medical care. This position is reinforced by the fact that most studies investigating the use of hypnotherapy in the setting of IBS have selected participants from a group refractory to the usual treatments.<sup>[33]</sup>

In an effort to overcome the barriers to the use of hypnotherapy, studies of group hypnotherapy and home hypnotherapy have been performed. Group hypnotherapy seems to have similar efficacy as individualized therapy, with two-thirds of patients showing clinical improvement and one-third being symptom free at the end of the study.<sup>[40]</sup> A pilot study of a home-treatment version of a scripted hypnosis protocol showed a 53% response rate; a rate somewhat lower than therapist-delivered hypnotherapy, but higher than a matched IBS control group who received standard medical care (26% response rate).<sup>[39]</sup> There are several versions of IBS home-hypnosis audio CDs and MP3 files available for purchase by patients over the internet, but the benefit of using these remains to be studied scientifically.

Of note, the hypnotherapy studies that have shown the highest degree of effectiveness were all performed in patients with severe, longstanding and refractory IBS.<sup>[25,31-37]</sup> This fact does not, however, rule out the effectiveness of hypnotherapy in interested individuals who have less-severe symptoms. The long-lasting nature of the improvements, in fact, suggests that early intervention might help avoid the commonly observed escalation in testing, studies, medication trials and costs associated with the long-term care of patients with functional bowel disease. An online site provides further information on hypnosis for IBS and a list of health professionals in the US who offer hypnosis therapy for IBS.<sup>[41]</sup>

## **Meditation**

Meditation is a term used to describe a broad range of practices that involve the training of attention. The literature available on the effects of meditation on IBS symptomatology is very limited. However, given that meditation is considered capable of altering a person's perception and response to stressors, it is possible that meditation might have a salutary effect on IBS symptomatology. As already mentioned, chronic sustained stress is an important factor in IBS symptomatology, and IBS sufferers seem to have a heightened perception of stress.<sup>[15-17,42]</sup>

The form of meditation most frequently taught in the health-care setting is called 'mindfulness meditation'. Clinical interventions based on mindfulness meditation are being described increasingly frequently in the medical literature and this technique is gaining popularity as a complementary treatment to standard medical treatment for many chronic disorders.<sup>[43]</sup> Mindfulness meditation has been defined as "the awareness that emerges by way of paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment,"<sup>[44]</sup> or as "the effort to intentionally pay attention, nonjudgmentally, to present-moment experience and sustain this attention over time."<sup>[45]</sup> Mindfulness practice is intended to cultivate nonjudgmental present-moment awareness, and is developed through a regular practice of meditation as well as informal mindfulness practices. An informal mindfulness practice involves bringing attention to an aspect of daily life, such as a manual task, eating a meal, or a conversation. Although described in spiritual traditions, such as Buddhism, mindfulness primarily concerns attention, and can, therefore, be considered a universal human attribute that can be developed through practice.

The most widely used standardized format for teaching mindfulness in the health-care system is known as mindfulness-based stress reduction (MBSR). This format of teaching mindfulness is conducted over an 8-week period (2.5 h per week) in a group format, with up to 30 participants per group. In 2002, more than 240 hospitals in the US were offering MBSR courses,<sup>[46]</sup> and the availability of this class has since increased.<sup>[47]</sup> MBSR teaches individuals several mindfulness techniques, including the body scan meditation, sitting meditation and Hatha yoga. These exercises are intended to develop nonjudgmental acceptance of physical sensations and associated thoughts and emotions. MBSR course participants are asked to practice these mindfulness skills for 45 min per day, 6 days a week, using CDs as audio guides.

There seems to be a high rate of incorporation of mindfulness practices into the daily lives of individuals who have completed the MBSR course. Indeed, 75% of MBSR participants continue to practice mindfulness meditation after the course has finished (follow-up 6-48 months).<sup>[43,48]</sup> Previous studies of mindfulness-based interventions suggest that there is improvement in symptoms or quality of life in patients who have disorders such as chronic pain, stress, anxiety, fibromyalgia, psoriasis, cancer, eating disorders or depressive relapse.<sup>[44,46,48-51]</sup> Unfortunately, most studies of MBSR suffer from methodological flaws, including inadequate control groups, use of invalidated measures and inadequate use of statistics, which limits the ability to draw firm conclusions from these studies.<sup>[46,49]</sup>

The 8-week MBSR course has been described as an effective intervention for relief of IBS symptoms, and there are reports of persons with gastrointestinal disorders completing the MBSR program;<sup>[52,53]</sup> however, no clinical studies describing the effect of MBSR on IBS symptoms or quality of life have been published, and so the efficacy of mindfulness practice as an intervention for IBS remains speculative. In our opinion, mindfulness meditation holds promise as an intervention for IBS because, as previously mentioned, a heightened baseline perception of stress,<sup>[14]</sup> catastrophizing,<sup>[54]</sup> a state of hypervigilance,<sup>[55,56]</sup> and gastrointestinal-specific anxiety<sup>[57]</sup> could represent psychological characteristics that can be modulated by mindfulness meditation.

Mindfulness is also correlated with an improved ability to regulate emotional affect, including an enhanced ability to correct unpleasant moods.<sup>[58,59]</sup> As anger and anxiety increase colonic motility (a relationship that is more pronounced in patients with IBS<sup>[60,61]</sup>), improved affect regulation through mindfulness training could modulate intestinal physiology in people with IBS.

Individuals with IBS also have prominent gastrointestinal symptom-specific anxiety that can act as an endogenous stressor (even without external stress), and this anxiety can contribute to ongoing IBS symptomatology.<sup>[57,62,63]</sup> Anxiety about IBS symptoms has a major role in quality-of-life impairment in patients with IBS,<sup>[64,65]</sup> and modulation of this anxiety by mindfulness could change both IBS physiology and the illness experience of the patient. The mental health benefits of mindfulness training are supported by several randomized, controlled trials (most using wait-list controls), which have shown a significant reduction in psychological distress or mood disturbance in persons randomly allocated to MBSR.<sup>[66-75]</sup>

MBSR might also improve quality of life for patients with IBS by promoting an attitude of acceptance. Standard medical treatments focus on unpleasant sensations, thoughts and emotions as symptoms of a disorder, to be changed or alleviated. For a chronic disorder such as IBS, for which curative medical treatments do not exist, this approach might not be ideal. MBSR encourages acceptance of physical discomfort without focusing on the need to alleviate unpleasant sensations. However, symptom reduction could actually result from this attitude of acceptance and nonstriving. A lessening of hypervigilance and gastrointestinal specific-anxiety could theoretically lead to an improvement in the symptoms of IBS because these phenomena have a role in the physiology of the disorder. Rigorous study of mindfulness training as a treatment modality for IBS is needed, and at the present time these comments remain speculative.

## **Relaxation and Stress Management, Multimodal Therapy and Biofeedback**

Several studies support a role for other stress-reduction techniques in the treatment of IBS. In a small study of 'relaxation response meditation', individuals with IBS had a significant reduction in IBS symptom scores at 1-year follow-up compared with baseline scores.<sup>[76]</sup> Behavioral stress-management techniques also seem to be helpful for the treatment of IBS. One study compared behavioral stress-management training alone with medical management in persons newly diagnosed with IBS: both therapies significantly reduced abdominal pain and diarrhea, but psychological symptoms decreased significantly more in the stress-reduction group.<sup>[77]</sup>

Two studies have assessed relaxation therapy as an intervention for IBS. In a study of 16 patients, Blanchard *et al.*, reported a greater reduction in symptom scores for patients who underwent relaxation therapy (two sessions in the first week followed by one session per week for the next 6 weeks), as compared with a control group.<sup>[78]</sup> Another small study of relaxation therapy showed that patients ( $n = 11$ ) who underwent eight 2 h sessions of relaxation therapy had greater symptom reduction than controls ( $n = 10$ ).<sup>[79]</sup>

Several studies have combined elements of relaxation therapy, education, and psychotherapy into a multicomponent intervention, and shown a reduction in gastrointestinal symptom scores following intervention.<sup>[80-83]</sup> The symptom improvement achieved by multimodal therapy seems to be durable. In a 4-year follow-up study of patients with IBS who completed a multicomponent treatment involving progressive muscle relaxation, thermal biofeedback (using a skin temperature sensor), cognitive therapy (see cognitive behavioral therapy below) and IBS education, 17 out of 19 of the patients rated themselves as more than 50% improved after treatment.<sup>[84]</sup> There were also significant reductions in abdominal pain/tenderness, diarrhea, nausea, and flatulence scores compared with pretreatment scores.

It is unclear whether the symptom reduction that occurs with a multimodality intervention is superior to an equivalent amount of time spent with a provider but without the multimodality intervention. One study compared a multicomponent intervention (relaxation, thermal biofeedback and cognitive therapy) with an attention-placebo control condition (in which contact time was equal to the multicomponent intervention) -- there was no reported advantage of the multicomponent treatment over the attention-placebo condition in symptom scores.<sup>[85]</sup> Both treatment arms showed significant reductions in gastrointestinal symptoms, as measured by daily symptom diaries, but there was no significant difference in symptom reduction between the two treatment arms. Another study that compared multicomponent intervention (education, relaxation therapy, cognitive therapy, plus medical therapy) with medical therapy alone reported that the multicomponent intervention led to significantly improved symptom scores and quality of life compared with medical care alone.<sup>[86]</sup>

Several small case series have described the use of 'bowel sound biofeedback'. This intervention involves the placement of an electronic stethoscope on the abdomen, with patients instructed to increase and decrease bowel sounds in an attempt to gain control over bowel activity; there has been some suggestion of efficacy.<sup>[87,88]</sup>

## **Cognitive Behavioral Therapy**

Cognitive behavioral therapy (CBT) seeks to identify patterns of behavior and thinking that lead to negative emotions and hinder progress toward desired life goals.<sup>[89]</sup> Although CBT is now not considered part of CAM, we include a review of CBT in this article because it is one of the most studied techniques involving a mind-body intervention for IBS. As described by Clark: "The therapist and patient collaborate to identify distorted cognitions, which are derived from maladaptive beliefs or assumptions. These cognitions and beliefs are subjected to logical analysis and empirical hypothesis-testing which leads individuals to realign their thinking with reality."<sup>[90]</sup> For physical health problems, CBT attempts to reduce physical symptoms by examining the association between physical sensations, thoughts, emotions and physiological responses. For IBS, interpretation of abdominal

discomfort as being a serious problem might lead to actions such as seeking medical consultation, hypervigilance toward bodily sensations, and increased physiological arousal and anxiety.<sup>[89]</sup> CBT teaches patients with a physical problem such as IBS how to reframe and adjust how they evaluate and judge their symptoms. Behavioral therapy focuses on establishing a distinction between 'disease' and 'illness'. Illness includes not only the effects of the disease but also the socially and personally determined behaviors associated with having that disease, otherwise known as the 'sick role'. The treatment then aims to alter this sick role. Historically CBT has been used to treat depression, anxiety disorders, phobias and multiple other psychiatric disorders.

When used for the treatment of IBS, CBT usually consists of five main steps. The first is education about the underlying pathogenesis of functional bowel diseases, the relationship between psychological and physical symptoms, and the effect of stress on the intestinal tract. The CBT model of treatment is also discussed. Then comes a time when the patient is asked to record their thoughts, emotions and symptoms, including their perceived relation to each other. Later the patient and therapist work together to identify underlying assumptions and thoughts related to, or influencing, their symptoms (the cognitive section). Stress management techniques are discussed and practiced. Lastly, patients are encouraged to re-engage in previously avoided activities or foods, monitor their actual symptoms and attempt to accept and modify their learned response (the behavioral section).<sup>[89]</sup>

Multiple studies have been performed since the mid 1980s to assess the impact of CBT on IBS symptoms, including several randomized, controlled trials ( [Table 2](#) ). Control groups have included attention-placebo controls, wait-list controls, and treatment-as-usual controls (in which patients continue to receive usual medical care for their condition). A review of CBT for IBS reported that 4 out of 10 controlled studies showed that CBT reduced gastrointestinal symptoms and psychological distress compared with wait-list or symptom-monitoring controls, and 3 studies found improvement in gastrointestinal symptoms after CBT at least equivalent to levels observed in patients receiving medical treatment.<sup>[91]</sup> Another review identified a total of 19 randomized, controlled trials of CBT for IBS, most of which are limited by small sample sizes.<sup>[92]</sup>

In one study by Blanchard *et al.*, 20 patients with IBS were randomly allocated to 10 sessions of CBT or 8 weeks of daily gastrointestinal symptom monitoring. It was found that, compared with baseline levels, 80% of patients randomly allocated to CBT had significant improvement versus 10% in the control group.<sup>[93]</sup> The same group of investigators subsequently sought to compare CBT with a control arm that accounted for attention and contact with a provider. Thirty-four patients with IBS according to the Rome criteria were randomly assigned to CBT, a self-help support group, or a waiting list.<sup>[94]</sup> There was a 67% average reduction in primary gastrointestinal symptom score for the CBT group as compared with 31% for the self-help group, and 10% for the wait-list group. Another study showed that 10 sessions of cognitive therapy resulted in greater gastrointestinal and psychological symptom improvement compared with symptom monitoring or a self-help support group.<sup>[94]</sup>

Despite these promising early studies, some larger, more-recent trials have had mixed results. Boyce *et al.* randomly allocated 105 patients who met the Rome I criteria for IBS to three arms, standard care alone or standard care together with either CBT or relaxation training, and followed them for 1 year.<sup>[95]</sup> Patients in all three groups improved significantly in bowel symptom frequency score and measures of quality of life (physical functioning, pain, general health, vitality and social functioning), but there was no significant difference between the three groups.<sup>[95]</sup> It is interesting to note that the CBT and the relaxation training groups had very high drop-out rates, with up to half of the participants lost to follow-up. Another large study randomly allocated female patients with functional bowel disorders to four treatment options: CBT, education, desipramine or placebo.<sup>[96]</sup> A total of 431 patients were randomly allocated to the treatment options, and an intention-to-treat analysis that used a composite outcome measure (satisfaction with treatment, global well-being, pain index, and quality of life) showed CBT to be significantly more effective than the education control arm.<sup>[96]</sup> In this trial, however, CBT was not directly compared to desipramine or drug placebo.

Overall, the weight of evidence from published trials shows that CBT is more beneficial than routine medical care for the treatment of IBS, and possibly more beneficial than attention-placebo control conditions (e.g. education and support). Most studies have only reported follow-up in the 6-12 month range, and further studies with longer term follow-up are needed. In one of the few studies with a long-term follow-up, rates of improvement of 80% or greater were found at the 4-year follow-up after CBT, suggesting that the benefits of CBT are durable.<sup>[84]</sup> The major limitation to the widespread use of CBT is that it is labor intensive, requiring a trained therapist and multiple treatment sessions. In order to increase the availability of this intervention, preliminary studies have investigated a self-administered version of CBT<sup>[97]</sup> as well as group CBT.<sup>[98,99]</sup> At this stage, however, the data are inconclusive and further study is needed before it can be determined whether the benefits of these modalities are equivalent to individual CBT.

## Conclusions

Standard treatments for IBS remain unsatisfactory for many patients. Indeed, numerous patients with IBS have sought the advice of a CAM practitioner. There are a broad range of CAM practices, and mind-body interventions hold particular promise as treatment modalities for IBS. In patients with IBS, a psychological stressor can result in intestinal symptoms through changes in intestinal function mediated by the autonomic nervous system, hypothalamic-pituitary-adrenal axis and immune system. As

described by the biopsychosocial model of medicine, modulation of the stress response can result in a change in intestinal function and the symptom experience for the patient.

Hypnotherapy is the most evidence-based mind-body intervention for IBS. There have been several well-designed clinical studies of hypnotherapy for IBS, including randomized, controlled trials, which uniformly show improvement of gastrointestinal symptoms, anxiety, depression, quality of life, disability and excess health-care costs. The major obstacle to the clinical use of hypnotherapy is its limited availability outside of centers with a special interest in hypnotherapy for IBS. Further study of group hypnotherapy as well as home hypnotherapy (by CD or other audioguides) is needed to expand the availability of this promising intervention.

Mindfulness meditation is a theoretically attractive technique for use in IBS, but remains unstudied. Small studies suggest a benefit of relaxation therapy or multimodal therapy (in which elements of relaxation therapy, education and psychotherapy are combined as an intervention), but the literature is too limited to enable definitive conclusions to be drawn. There have been several clinical trials of CBT for IBS, and evidence favors CBT as being superior to routine medical care for IBS and possibly better than education and support. Most studies of CBT have a reported follow-up of 6-12 months, and longer term follow-up studies are needed for this widely available intervention to determine its durability as a treatment modality for IBS. At present, psychological treatments such as CBT or hypnotherapy require patients to undergo several treatment sessions, and are generally reserved for patients who do not respond to standard treatment options for IBS. More research is needed to determine whether self-study or group versions of CBT or hypnotherapy are as effective as therapist-delivered treatment. If efficacious, self-study or group versions of hypnotherapy or CBT would increase the availability of these mind-body interventions.

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