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## **The Role of Non-pharmacological Treatments of Irritable Bowel Syndrome: A Literature Review**

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## **Abstract**

**Introduction and purpose:** Irritable bowel syndrome (IBS) is among the most frequently diagnosed gastrointestinal disorders posing a substantial burden on healthcare systems and presenting ongoing clinical challenges. IBS significantly affects quality of life because it is usually associated with chronic abdominal pain and altered bowel habits. Therapeutic approaches encompass both pharmacological and non-pharmacological strategies. Given the incomplete understanding of its pathophysiology, first-line treatment should prioritize non-pharmacological interventions, which are devoid of adverse effects. This article aims to give you an overview of the trials that have looked at the effects of non-pharmacological management of irritable bowel syndrome and to discuss their role in the treatment of IBS.

**Brief description of the state of knowledge:** The group of most important non-pharmacological interventions in IBS treatment includes dietary modifications, particularly the low-FODMAP diet, as well as psychological therapies, including cognitive behavioral therapy, gut-directed hypnosis, and mindfulness-based interventions. Data from meta-analyses and randomized controlled trials (RCTs) highlight their efficacy in symptom reduction and quality of life improvement. A key consideration is the potential synergy between dietary and psychological approaches, as supported by emerging evidence.

**Conclusion:** Low-FODMAP diet and psychological interventions, including cognitive behavioral therapy, gut-directed hypnosis, and mindfulness, are effective treatment strategies for irritable bowel syndrome. The analyzed studies, including meta-analyses and randomized controlled trials, confirm their significant impact on symptom reduction and improvement in patients' quality of life. Given the incomplete understanding of IBS pathophysiology, non-pharmacological approaches should be considered first-line treatments, as they minimize the risk of adverse effects.

Key words: Irritable bowel syndrome; Low FODMAP Diet; Treatment; Hypnotherapy; Mindfulness; Psychological Treatment.

## **Introduction and background**

IBS is a functional bowel disorder characterized by abdominal pain or discomfort linked to defecation or changes in bowel habits, often accompanied by signs of disordered defecation [1]. IBS is diagnosed more often in women than in men [2]. IBS is further classified into subtypes based on the predominance of symptoms: constipation-predominant (IBS-C), diarrhea-predominant (IBS-D), mixed bowel habits (IBS-M), and unclassified (IBS-U) [3]. According to the Rome IV criteria, the global prevalence of IBS ranges from 5% to 10% [4]. IBS pathogenesis is complex and not fully understood, with several proposed theories to explain its symptoms, including alterations in the intestinal microbiota, psychological factors, and disruptions in the gut-brain axis [5]. Symptoms must have started at least six months prior, with abdominal pain or discomfort occurring at least three days per month for three months within the last six months. Additionally, symptoms should be associated with at least two of the following: relief with defecation, onset linked to a change in stool frequency, and/or a change in stool consistency. Many IBS patients also report bloating and abdominal distension, indicating heightened sensitivity to normal levels of intestinal gas [6]. Environmental factors contributing to the development of IBS include psychological stress, infections, antibiotic exposure, dietary habits, and food sensitivities [7]. At least 50% of individuals with IBS exhibit symptoms of depression, anxiety, or hypochondriasis. Moreover, over 60% of IBS patients seeking tertiary care have been diagnosed with a psychiatric disorder, with depression, anxiety, or a combination of both being the most prevalent [8]. The main purpose of this review is to illustrate the assessment of non-pharmacological interventions for IBS aims to evaluate their efficacy and examine their contribution to the overall management of IBS.

## Description of the state of knowledge

### Non-pharmacological treatment options

Individuals with IBS report a lower quality of life compared to healthy individuals, with diet playing a significant role in their lifestyle. Many patients associate their IBS symptoms with the foods they consume. Consequently, many adopt food avoidance behaviors, which are linked to a decreased quality of life, emphasizing the negative impact diet can have on their well-being [9]. Managing IBS is complex and typically requires a combination of both non-pharmacological and pharmacological treatments. The primary objectives of treatment are to relieve symptoms, enhance quality of life, and improve social and work functioning. Non-pharmacological treatment strategies include dietary changes, such as following the low FODMAP diet (which restricts fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) [10] and other approaches have been used to manage IBS symptoms, such as regular stress management, relaxation techniques, meditation, mindfulness, gut-directed hypnotherapy, and cognitive behavioral therapy (CBT) [2]. Additionally, alternative treatments like acupuncture are utilized to alleviate abdominal pain. A novel alternative therapy, auricular neurostimulation, has also been found to reduce abdominal pain in adolescents [11].

### Low-fodmap diet

The latest British Society of Gastroenterology guidelines emphasize that dietary interventions should be the first-line treatment, with a strong recommendation despite the low quality of evidence [7]. The National Institute for Health and Care Excellence (NICE) provides traditional dietary recommendations for individuals with IBS, emphasizing the importance of maintaining a consistent meal schedule while avoiding both excessively large meals and meal skipping. Additionally, patients are advised to consume approximately 2 liters of fluids per day, while limiting the intake of alcohol, carbonated beverages, high-fat foods, insoluble fiber, caffeine, and gas-producing foods, such as fresh fruit [12].

FODMAPs are short-chain, non-absorbable, osmotically active carbohydrate compounds that contribute to bloating and discomfort when present in the small intestine, a concept known as the small bowel hypothesis. Additionally, when fermented by colonic bacteria, they can lead to bloating and flatulence, as described in the large bowel hypothesis. Furthermore, evidence suggests that FODMAPs may increase endothelial barrier permeability, trigger immune activation, and induce low-grade inflammation, all of which may play a significant role in the pathogenesis of IBS. Moreover, FODMAPs have been shown to influence the composition and function of the colonic microbiota [13].

Soluble fiber, such as ispaghula, has been demonstrated to be an effective therapeutic option for alleviating overall symptoms and abdominal pain in individuals with IBS. In contrast, insoluble fiber (e.g., wheat bran) should be avoided, as it may exacerbate symptoms. It is recommended that soluble fiber intake begin at a low dose (3–4 g/day) and be gradually increased to minimize the risk of bloating. This recommendation is supported by strong clinical consensus, with a moderate quality of evidence. A diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (low-FODMAP diet) serves as an effective second-line dietary intervention for managing overall symptoms and abdominal pain in IBS. However, its implementation should be overseen by a qualified dietitian, and the reintroduction of FODMAP-containing foods should be conducted gradually, based on individual tolerance [14]. The low-FODMAP diet is implemented through three distinct phases: restriction, gradual reintroduction, and individualized personalization [15].

The implementation of a low-FODMAP diet can be structured using two primary approaches: top-down and bottom-up. The bottom-up approach begins with the selective reduction of specific high-FODMAP foods for a designated period, with further dietary restrictions introduced only if necessary. In contrast, the top-down method consists of three distinct phases: an initial period of FODMAP restriction, a gradual reintroduction of previously eliminated foods to assess individual tolerance, and a final stage of dietary personalization, where a modified FODMAP-containing diet is tailored to the individual's needs. Notably, most of the available evidence supports the superior efficacy of the top-down approach [16].

13 randomized controlled trials (RCTs) involving a total of 944 patients were examined by network meta-analysis, evaluating the effectiveness of a low-FODMAP diet in comparison to various control interventions, such as a habitual diet or conventional dietary recommendations.

In this analysis, the low-FODMAP diet demonstrated the highest efficacy across all evaluated outcomes [17].

Emerging evidence suggests that an individual's response to a low-FODMAP diet may be influenced by their gut microbiome. Additionally, microbiome-based, artificial intelligence-assisted personalized dietary interventions have been proposed as potentially more effective than the standard low-FODMAP diet. However, current evidence supporting the clinical utility of microbiome testing in routine practice remains limited. Moreover, concerns have been raised regarding the potential risks associated with the increasing availability of direct-to-consumer microbiome tests, which often lack regulatory oversight [18]. The randomized controlled trial by Van den Houte et al. included 117 IBS patients who responded to a 6-week low-FODMAP diet, defined by a reduction in IBS symptom severity score (IBS-SSS). Participants then underwent a 9-week blinded reintroduction phase with FODMAP powders or a glucose control to identify symptom triggers. Symptom recurrence occurred in 85% of cases, with an average of 2.5 triggers per patient. Fructans (56%) and mannitol (54%) were the most common triggers, followed by galacto-oligosaccharides (35%), lactose (28%), fructose (27%), sorbitol (23%), and glucose (26%). The study confirmed the efficacy of a low-FODMAP diet and demonstrated a personalized symptom recurrence pattern [19]. Another RCT included 294 adults with moderate-to-severe IBS, comparing a low-FODMAP diet (LFTD), a low-carbohydrate diet, and optimized pharmacological treatment over 4 weeks. Symptom reduction (IBS-SSS  $\geq 50$ ) occurred in 76% (LFTD), 71% (low-carbohydrate), and 58% (pharmacological) ( $p=0.023$ ). Adherence was high, with no serious adverse events. Dietary interventions were more effective than pharmacological treatment [20].

The findings from these studies suggest that the low-FODMAP diet, particularly when personalized through methods like the top-down approach and reintroduction phases, is an effective treatment for IBS, outperforming conventional dietary recommendations and pharmacological treatments. While the diet's efficacy is well-supported, individual responses may vary, potentially influenced by factors such as the gut microbiome. However, further research is needed to establish the clinical utility of microbiome-based personalized interventions.

## Hypnotherapy

Hypnotherapy is a form of psychotherapy that utilizes hypnosis, a state of focused awareness in which an individual's attention is detached from their external surroundings and deeply engaged with internal experiences, including cognition, imagery, and emotions [21]. Gut-directed hypnotherapy (GDH) is a gut-brain behavioral therapy often used for IBS patients. It begins with a hypnotic induction aimed at inducing relaxation and an altered state of consciousness. During this state, suggestions are made to normalize gastrointestinal function, typically through repetitive visualization. For example, the subject may be asked to imagine placing a hand on their abdomen, feeling warmth and soothing sensations, which help restore control and calmness to the area, thereby reestablishing dysregulated gut-brain pathways [22]. This RCT (IMAGINE) compared hypnotherapy with educational therapy for IBS. Patients were assigned to individual hypnotherapy, group hypnotherapy, or control. At 3 months, 40.8% of individuals, 33.2% of the group, and 16.7% of control patients reported adequate relief. At 12 months, 40.8%, 49.5%, and 22.6%, respectively, reported relief. Group hypnotherapy was non-inferior to individual therapy. Hypnotherapy, especially group therapy, is an effective and cost-efficient treatment for IBS [23].

Another study evaluated the effectiveness of 8 sessions of hypnotherapy over 12 weeks, with a primary focus on changes in IBS severity. Secondary outcomes included improvements in extracolonic and psychological symptoms, as well as quality of life, with follow-up at 6 months. Nurse-administered hypnotherapy, whether individual or group-based, significantly alleviates IBS symptoms and improves quality of life, with group hypnotherapy being a viable, cost-effective alternative [24]. A major barrier to the broader implementation of gut-directed hypnotherapy is the cost of delivery, which includes the need for a trained therapist and the time commitment. Patients with severe IBS in tertiary care, who experience significant functional limitations, may require individualized hypnotherapy, with sessions tailored to their specific symptom profiles [25]. Two evidence-based protocols for IBS hypnotherapy currently exist: the Manchester Approach and the North Carolina Protocol, both designed to be delivered over 6 to 12 sessions. Multiple RCTs have demonstrated significant reductions in IBS symptom severity with treatment effects lasting up to 6 years. Additionally, GDH has been shown to alleviate extraintestinal symptoms commonly associated with IBS. Patients

undergoing the North Carolina protocol have experienced substantial improvements in both physical symptoms (such as stool consistency, abdominal pain, and bloating) and psychological symptoms (including anxiety, depression, and somatization). Similar outcomes were observed with the Manchester Protocol, including a large cohort study of 1000 refractory IBS patients, where 76% showed significant symptom reduction (defined as at least a 50-point reduction in the IBS Severity Scoring System). Furthermore, GDH has been associated with improved health-related quality of life and decreased medication use [26]. The evidence from these studies points to that hypnotherapy, whether administered individually or in groups, is an effective treatment for IBS, significantly improving symptoms and quality of life, with group therapy offering a cost-effective alternative to individual therapy.

### Cognitive Behavioral Therapy

CBT is a time-limited, skills-oriented therapeutic approach aimed at modifying maladaptive behaviors and cognitive patterns to impact emotional states and physiological symptoms. The specific techniques and focus of CBT can vary significantly within its overarching framework. Nevertheless, CBT treatments for IBS incorporate various techniques like psychoeducation, relaxation strategies, cognitive restructuring, problem-solving skills and exposure techniques [27]. One study assessed cognitive-behavioral therapy for refractory IBS. Adults with persistent symptoms were recruited. Both telephone and web-based therapy significantly reduced symptoms and improved daily functioning compared to standard treatment, with no serious adverse events [28]. The study by Kenwright et al. demonstrated that patients who underwent cognitive behavioral therapy targeting bowel control anxiety exhibited significant reductions in both anxiety and IBS symptoms after six months. Additionally, these individuals showed improvements in phobic anxiety measures, indicating that addressing bowel control anxiety through CBT may be an effective strategy for managing IBS-related distress [29]. In a feasibility study, individuals with IBS participated in a 12-week, self-guided online cognitive behavioral therapy (web-CBT) program. The findings indicated a notable reduction in IBS symptom severity, as assessed by the IBS Symptom Severity Score, with improvements sustained at both the 2-month and 3-month follow-ups compared to baseline [30].

Mohebbi et al. (2021) conducted a randomized controlled trial in Iran with 100 participants, demonstrating that gastrointestinal symptom severity significantly improved in the

hypnotherapy group between six- and fifteen-weeks post-intervention. Additionally, after fifteen weeks, patients reported enhanced quality of life. The findings suggest that combining hypnotherapy with pharmacological treatment may be a beneficial approach for both patients and healthcare systems [31].

## Mindfulness

Mindfulness-based therapy (MFT) for IBS, derived from mindfulness-based stress reduction (MBSR), integrates mindfulness skills like breath awareness and conscious eating to reduce symptoms. It encourages nonjudgmental observation of pain, thoughts, and emotions, fostering acceptance and reducing the influence of pain, anxiety, and depression [32]. Mindfulness interventions are linked to increased life satisfaction, success, self-confidence, optimism, overall well-being, and positive emotions. Mindfulness techniques have been shown to enhance life quality and provide effective coping strategies, reduce depression, and lessen anger. Research indicates that mindfulness is associated with better mental health outcomes, including higher levels of positive emotions, vitality, adaptive emotional regulation, and lower levels of negative emotions and psychological distress [33].

One study investigated the effects of an 8-week MBSR program on gastrointestinal symptoms, quality of life, and Gastrointestinal-specific anxiety in IBS patients. Among participants, 71% showed symptom improvement. Significant increases were observed in three mindfulness facets, with “Act with Awareness” being the strongest predictor of symptom and quality-of-life improvement. The study has shown that MBSR effectively alleviates IBS symptoms, with present moment focus and awareness playing a key role in therapeutic outcomes [34]. An alternative study examined the long-term impact of MFT on the quality of life in 24 IBS patients. After a two-month follow-up, the experimental group showed significant improvement in quality of life compared to the control group, suggesting MFT's effectiveness in enhancing well-being in IBS patients [33].

## Conclusion

This review highlights the effectiveness of a low-FODMAP diet and psychological therapies, such as cognitive behavioral therapy, gut-directed hypnosis, and mindfulness, in managing IBS. Evidence from meta-analyses and randomized controlled trials supports their role in

alleviating symptoms and enhancing patients' quality of life. Considering the incomplete understanding of IBS pathophysiology, these non-pharmacological interventions should be prioritized as first-line treatments due to their favorable safety profile.

## **Disclosure**

### Author's contribution

- Conceptualization: Oliwia Mentel, Mikołaj Łabuda
- Methodology: Teresa Sowińska, Jakub Sikora, Karolina Knychalska
- Software: Aleksandra Słojewska, Karolina Knychalska, Jakub Sikora
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In preparing this work, the authors used ChatGPT for the purpose of improving language and readability. After using this tool, the authors have reviewed and edited the content as needed and accept full responsibility for the substantive content of the publication.

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