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Current Treatment Strategies for Irritable Bowel Syndrome – A Literature Review

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ABSTRACT

Background. Irritable bowel syndrome is one of the most common chronic gastrointestinal disorders. This disease is diagnosed worldwide, although it is much more common in developed countries. The main role in the development of the disease is attributed to dysfunction of the brain-gut axis and factors such as intestinal microbiota dysbiosis and prolonged exposure to stress. The symptoms significantly reduce the quality of life of patients, which is why it is so important to develop clear recommendations for better control of the condition.
Aim. The aim of this study was to analyse and summarise current pharmacological and non-pharmacological strategies for treating irritable bowel syndrome.
Materials and methods. A review of the literature available in the PubMed, Google Scholar and Cochrane databases was conducted. Articles published between 2012-2025 were considered. Publications of low methodological quality and those containing incomplete data were excluded.
Results. According to research, the best dietary intervention is a low-FODMAP diet, but it should be followed under the supervision of an experienced dietitian. Probiotics should be considered as first-line medications. A growing number of publications point to the beneficial effects of psychotherapy, regular moderate-intensity physical activity, and healthy eating habits, especially regular consumption of small meals. The impact of quality sleep and stress management skills on prolonging IBS remission is also emphasized, but the scientific evidence is not yet strong enough.
Conclusions: Changes in diet and eating habits have been shown to be important in reducing symptoms and prolonging remission. There are many pharmacological options available, but there are no clear guidelines due to the complex pathomechanism of the disease. Currently,

probiotics are the most recommended treatment. Herbal therapies, psychotherapy, mindfulness techniques, physical activity should be considered as additional support.
Keywords: irritable bowel syndrome, Low FODMAP diet, antibiotic, probiotic, therapy, supplementation, physical activity, meditation, mindfulness, stress

INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic digestive disorder in which no morphological or biochemical basis for the symptoms has been found that could be detected using currently available diagnostic methods (Enck et al., 2016). A growing number of scientific studies addressing the issue of irritable bowel syndrome mean that it is increasingly referred to as a brain-gut axis disorder (Huang et al., 2023) (formerly known as functional disorder). The clinical picture varies across the population, which is why subtypes of the disease are distinguished based on the predominant symptoms reported by the patient. Common indicators of the disease, regardless of subtype, are changes in the frequency and/or form of stool and recurrent pain or discomfort in the abdomen, which are temporally related to defecation. The occurrence of the disease leads to a reduction in patients' quality of life (QOL) and places a heavy burden on the healthcare system (Shin & Xu, 2024).

Due to the predominant symptoms of the clinical picture, IBS can be divided into subtypes: IBS-C – in which constipation predominates; IBS-D – where chronic diarrhoea predominates; IBS-M – which is a mixed subtype; and IBS-U – which is defined as unclassified.

Its prevalence in the general population is approximately 5–10% (Sebastián Domingo, 2022), but it may vary depending on the region of the world, research methodology and the diagnostic criteria adopted for IBS (Huang et al., 2023), which means that it needs to be verified using a standardised diagnostic scheme. According to studies conducted in the USA, the prevalence can reach up to approx. 16% (Sperber et al., 2021).

Irritable bowel syndrome is more common in women (although currently its prevalence in Asian countries does not show a gender preference (Huang et al., 2023)), in younger people and in people with a history of gastrointestinal infections (Enck et al., 2016; Lovell & Ford, 2012).

The aetiology of IBS is multifactorial and includes components such as brain-gut axis disorders ; increased visceral sensitivity resulting from excessive signalling from intestinal receptors to the CNS due to stretching of the intestinal wall (Karakan et al., 2021; Rusch et al., 2023); gastrointestinal motility disorders (dysregulation of peristaltic contractions, accelerated or delayed intestinal transit); intestinal microbiota dysbiosis (Mancabelli et al., 2017; Wei et al., 2021); food intolerances; conditions following gastrointestinal infections (Futagami et al., 2015); inflammation of the intestinal mucosa (Burns et al., 2022; Singh et al., 2020); increased intestinal barrier permeability (Hanning et al., 2021); psychosocial factors (e.g. exposure to chronic stress) (Qin, 2014).

Currently, irritable bowel syndrome is diagnosed based on the presence of clinical symptoms, excluding other conditions that could be the cause. These symptoms must meet the Rome IV criteria from 2016 (Schmulson & Drossman, 2017):

1. Recurrent abdominal pain on average at least 1 day per week in the last 3 months, associated with two or more of the following criteria:
    1.1. Related to defecation
    1.2. Associated with a change in frequency of stools
    1.3. Associated with a change in form (appearance) of stool
2. Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

The diagnosis of individual subtypes includes the above criteria and the fulfilment of additional criteria specific to a given subtype, i.e.:

1. IBS-C (IBS with predominant constipation): >25% of bowel movements with Bristol stool types 1 or 2 and <25% of bowel movements with Bristol stool types 6 or 7;
2. IBS-D (IBS with predominant diarrhoea): >25% of bowel movements with Bristol stool types 6 or 7 and <25% of bowel movements with Bristol stool types 1 or 2;
3. IBS-M (IBS with mixed bowel movements): >25% of bowel movements with Bristol stool types 1 or 2 and >25% of bowel movements with Bristol stool types 6 or 7;

4. IBS-U (unclassified IBS): Patients who met diagnostic criteria for IBS but whose bowel habits cannot be accurately categorised into 1 of the 3 groups above.

It should be noted that the above-mentioned symptoms are not the only ones reported by patients (Someili et al., 2025). Typical symptoms of IBS are often accompanied by other symptoms such as bloating, nausea, dyspepsia, food intolerances, micturition disorders, sexual dysfunction, PMS, chronic fatigue syndrome, muscle pain, anxiety disorders, depression or sleep disorders (Enck et al., 2016). Although these symptoms are not the basis for the diagnosis of irritable bowel syndrome, it should be borne in mind that a holistic approach to the patient and their symptoms may influence the success of treatment.

Although the current diagnostic standard for IBS is based on the 2016 Rome IV Criteria, advances in our understanding of the pathophysiology of the gut-brain axis make it necessary to update the diagnostic algorithm. The publication of Rome V Criteria, anticipated for 2026, aims not only to optimize the diagnostic process but also to refine therapeutic strategies based on current medical knowledge. It is worth noting that redefining the criteria may have a real impact on epidemiological statistics that have thus far been based on Rome IV Criteria.

The anticipated changes to the Rome V Criteria may include adding abdominal discomfort alongside pain as an inclusion criterion, changing the frequency of symptoms from at least once a week to at least three times a month over the past three months, or specifying the nature of the pain or discomfort as intermittent to distinguish IBS from central abdominal pain syndrome. A possible additional auxiliary criterion—that symptoms indicative of IBS are not exclusively associated with menstrual bleeding—could aid in the differential diagnosis of IBS from menstrual-related pain in women. These changes may increase the detection rate of IBS among individuals experiencing symptoms that previously did not meet the inclusion criteria according to Rome IV, offering these patients hope for proper treatment of the condition.

RESEARCH RESULTS

The research results presented in this section are divided into three areas: diet, pharmacological treatment, and non-pharmacological treatment.

Diet for IBS

The best-known diet for IBS is the Low FODMAP diet (LFD). It is a restrictive elimination diet low in fermentable oligosaccharides, disaccharides, monosaccharides and polyols. It involves excluding foods rich in fructose, fructans, galactans and polyols (e.g. xylitol, sorbitol) from the diet. The diet is usually implemented in a top-down manner. For the first 4-6 weeks, FODMAP products are completely eliminated from the diet, followed by a gradual reintroduction of product groups and an assessment of symptom severity. The final stage is personalisation, which allows the target diet to be determined while maintaining symptom remission. It should be noted that this diet should be followed under the supervision of a specialist, with particular caution in people with eating disorders or a predisposition to them (Whelan et al., 2024).

Meta-analysis (Khalighi Sikaroudi et al., 2024) confirms that short-term use of the Low FODMAP diet significantly alleviates the overall severity of IBS symptoms (IBS-SSS), including abdominal pain, bloating, irregular bowel movements, and improves stool consistency and frequency.

It has also been shown that the Low FODMAP diet can lead to a moderate improvement in patients' quality of life, as measured by the IBS-QoL. However, it should be noted that this effect was mainly observed in studies of low methodological quality. The Low FODMAP diet does not have a significant effect on anxiety and depression levels, as assessed using the HADS questionnaire. However, a reduction in feelings of lethargy has been reported (Khalighi Sikaroudi et al., 2024; Wang et al., 2021).

The same meta-analysis (Khalighi Sikaroudi et al., 2024) showed that LFD may lead to intestinal dysbiosis, in particular to a reduction in the number of Bifidobacterium bacteria. Further research is needed on the safety and long-term effects of LFD.

It should be emphasized that the lowFODMAP diet is a relatively short-term intervention. According to the recommendations, the maximum duration of the elimination phase is 6 weeks. Then, the previously eliminated products are gradually reintroduced, while monitoring the patient's condition. It is very important to educate patients in advance about expanding their diet so that they can identify the products that most exacerbate their symptoms. After completing the diet expansion phase, an individual nutrition plan should be established with the patient based on the elimination of foods that negatively affect the course of the disease. (Whelan et al., 2024). In addition, it is worth using the intervention period to work on changing

habits in order to avoid the dietary mistakes made before the LFD was introduced. The main goal of the diet should be long-term symptom management through the application of generally accepted principles of healthy eating and, if necessary, the elimination of certain foods, rather than the permanent avoidance of all FOODMAPs. (Bellini et al., 2020)

An important addition to the diet in IBS is dietary fibre supplementation. Studies confirm that soluble fibre intake effectively alleviates the main symptoms of IBS. The best results were observed with psyllium husk. The authors emphasise that the effectiveness of supplementation depends on the appropriate selection of fibre type, a well-tolerated dose and a gradual increase in dosage (Cozma-Petruţ et al., 2017; Whelan et al., 2024). On the other hand, insoluble fibre (e.g. wheat bran) does not show significant clinical benefits, and in some studies it caused an increase in symptoms, especially bloating and abdominal pain.

Other, less restrictive diets are also being researched, including the BDA/NICE diet, the Mediterranean diet, a diet low in lactose/starch/sucrose, but the results of meta-analyses do not allow for clear conclusions to be drawn about their effectiveness and thus for clinical recommendations to be made regarding their use, and the Low FODMAP diet remains the diet with the best-documented effect on reducing IBS symptoms (Cuffe et al., 2025).

Pharmacological strategies for IBS

Due to the fact that there is no single identifiable pathomechanism in irritable bowel syndrome and its pathogenesis is multifactorial, it has not yet been possible to develop a specific targeted causal treatment. For this reason, patient therapy is based on symptomatic treatment (Ford et al., 2023; Vasant et al., 2021).

First-line drugs for IBS

In pharmacological treatment, the first-line drugs for IBS are mainly probiotics (Goodoory et al., 2023), laxatives, antispasmodics and anti-diarrhoeal drugs, administered depending on the subtype of the disease (Khasawneh et al., 2025; Vasant et al., 2021). Probiotics can be an effective method of treating general symptoms of IBS and troublesome abdominal pain, and they improve patients' scores on the IBS-QOL scale (Skrzydło-Radomańska et al., 2021) but current recommendations do not take into account the selection of specific species and strains.

According to the latest recommendations, probiotic therapy should be continued for a maximum of 12 weeks (Vasant et al., 2021). In most studies, the use of probiotics was safe and well tolerated by patients (Goodoory et al., 2023). The effectiveness of probiotics is directly dependent on their composition and dosage (Skrzydło-Radomańska et al., 2021). Strains of the genus Lactobacillus, Bifidobacterium bifidum MIMBb75, as well as those of the genus Escherichia, Bacillus, Streptococcus faecium and Clostridium butyricum have a key impact on the general symptoms of irritable bowel syndrome (Goodoory et al., 2023). In addition, it has been proven that the Bacillus strain leads to the alleviation of IBS symptoms such as stool urgency and flatulence, and has the most beneficial effect in improving these symptoms in IBS (Wu et al., 2024; Zhang et al., 2022). The use of various combinations yielded beneficial effects, with Bifidobacterium and Lactobacillus being the main strains in probiotic combinations that produced such results (Wu et al., 2024). It has also been shown that multi-strain preparations are more effective than single-strain preparations. It should be noted that the probiotic preparation must be appropriately matched to the main symptoms presented by the patient (Skrzydło-Radomańska et al., 2021).

First-line pharmacotherapy for IBS-D and IBS-M often includes the opioid receptor agonist loperamide (Vasant et al., 2021). It is a synthetic phenylpiperidine opioid with high lipophilicity, which may be a potentially effective drug for treating diarrhoea in IBS-D (Vasant et al., 2021). It mainly reduces symptoms associated with bloating and nausea (Choi et al., 2025). Some data show that treatment with loperamide significantly affects bowel movement rhythm and improves stool consistency without significantly affecting the severity of general and extraintestinal symptoms in IBS (Crawford et al., 2023). It is a drug with high-quality evidence (Vasant et al., 2021). However, the risk of side effects is considerable and includes persistent abdominal pain and constipation (Vasant et al., 2021).

Second-line drugs

According to current recommendations, the following second-line drugs are effective in treating IBS: Tricyclic antidepressants (TCAs) are effective in treating general symptoms of IBS and chronic abdominal pain (Vasant et al., 2021). Treatment with drugs in this category should be started at low doses and gradually increased to a maximum dose of 30–50 mg per day (Vasant et al., 2021). Studies have shown the validity of using amitriptyline in small doses, as it provides significant benefits in alleviating the symptoms of irritable bowel syndrome due to its peripheral effect on slowing intestinal motility and its good analgesic effect (Ford et al., 2023).

Amitriptyline used in low doses was safe and well tolerated by patients with gradual, individual dose adjustment (Ford et al., 2023).

Data show that selective serotonin reuptake inhibitors (SSRIs) may also be recommended as second-line drugs for the treatment of general IBS symptoms such as headaches, fatigue and psychological discomfort, but the quality of evidence in this case is relatively low (Vasant et al., 2021).

It should be noted that the patient must be thoroughly informed about the course of therapy and the side effect profile of the medicinal substances in question, both when using TCAs and SSRIs.

Eluxadoline is a drug that acts on mixed opioid receptors and is used in IBS with diarrhoea (Vasant et al., 2021). In patients with IBS-D, eluxadoline is effective in relieving abdominal pain and significantly improving stool consistency (Lembo et al., 2016). It is contraindicated in patients who have undergone cholecystectomy, are alcohol dependent, have severe hepatic impairment, or have a history of documented problems with the contractile function of the sphincter of Oddi (Vasant et al., 2021). 5-HT3 receptor antagonists appear to be the most effective treatment for IBS-D as second-line drugs (Jafari et al., 2024; Vasant et al., 2021). Due to the general low availability of alosetron and ramosetron, ondansetron is an alternative, starting at a dose of 4 mg once daily up to a maximum of 8 mg three times daily. Ondansetron reduces the number of diarrhoea episodes and the urge to defecate, as well as pain, and improves stool consistency in IBS-D (Jafari et al., 2024; Vasant et al., 2021).

Rifaximin, a semi-synthetic derivative of rifamycin SV, is a non-absorbable antibiotic used as a second-line treatment for diarrhoea-predominant IBS, although it is not available for this indication in many countries (Vasant et al., 2021). Treatment of IBS-D includes therapy with rifaximin, which has a non-systemic effect. Short-term use of rifaximin is well tolerated and helps reduce intestinal symptoms in people with IBS-D. Research data indicate that the drug has a beneficial effect on stabilising the intestinal microbiota and normalising inflammation of the intestinal mucosa (Chey et al., 2020). In the treatment of IBS-C, linaclotide and tenapanor are second-line drugs (Vasant et al., 2021) that show potential efficacy in alleviating pain symptoms in the digestive system. However, it is important to carefully select the dose and apply the most optimal treatment regimen (Mou et al., 2025). Linaclotide is a guanylate cyclase C agonist, a highly effective secretagogue in the treatment of IBS-C (Vasant et al., 2021). Linaclotide is effective in regulating stomach and intestinal muscle contractions and also improves bowel movement rhythm due to its role in accelerating intestinal transit (Mou et al., 2025). Tenapanor is a sodium-hydrogen exchanger (NHE3) inhibitor with minimal absorption, acting locally in the gastrointestinal tract (Herekar et al., 2023; Vasant et al., 2021), reducing

abdominal pain and controlling constipation in IBS-C (Herekar et al., 2023). When using linaclotide and tenapanor, a common side effect may be diarrhoea (Vasant et al., 2021). Lubiprostone is a chloride channel activator, also used as a second-line treatment for IBS-C, which, compared to other secretagogue drugs, causes fewer side effects such as diarrhoea.

Alternative treatments

It is worth noting that some herbal therapies, in particular the use of peppermint oil and Iberogast (STW5 5), have been shown to be effective in a number of randomised controlled trials (Abalo et al., 2025). Peppermint oil appears to help with the general symptoms of IBS, but due to discrepancies between some studies, its actual effectiveness is questionable (Ingrosso et al., 2022). Preclinical studies have also demonstrated the antispasmodic and anti-inflammatory properties of other plant substances, such as cannabis derivatives, curcumin and fennel oil. It has been proven that combining multiple preparations in herbal therapies leads to a reduction in the severity of IBS symptoms and an improvement in patients' quality of life (Abalo et al., 2025). In addition, it was found that in patients with IBS-D, monotherapy with alternative herbal medicine showed good results in treating individual symptoms, such as diarrhoea and flatulence, compared to placebo. In patients with IBS-C, monotherapy with herbal preparations was effective in regulating bowel movement frequency and reducing stool consistency. In both cases (IBS-C and IBS-D), this therapy helped prevent recurrence of the disease and alleviate digestive pain (Jun et al., 2022).

Furthermore, numerous meta-analyses and randomised controlled trials suggest the use of oral vitamin D supplementation in adolescents and adults diagnosed with irritable bowel syndrome (IBS). It has been shown that vitamin D supplementation leads to a significant improvement in both IBS symptom severity scores (IBS-SSS) and quality of life (QOL) scores in patients suffering from irritable bowel syndrome, compared to the control group (Cara et al., 2025; Qi et al., 2025).

Non-Pharmacological strategies for IBS

The symptoms of irritable bowel syndrome are exacerbated by chronic stress and mental disorders. For this reason, numerous studies have been conducted on the impact of non-

pharmacological approaches: psychotherapy, meditation, mindfulness, physical activity, sleep quality and eating habits, on the course of the disease.

Psychotherapeutic intervention

A significant reduction in symptoms and improvement in quality of life were demonstrated after a group of patients underwent therapy, with the greatest effects observed in cognitive-behavioural therapy and intestinal hypnotherapy. However, even attempting psychotherapy in a different form plays a significant role in reducing the severity of symptoms. (Black et al., 2020; Fernandes et al., 2024)

It primarily affects stress levels, or rather, teaches techniques for reducing stress and managing emotions appropriately. (Pourkazem et al., 2023; Taghvaeinia et al., 2024)Similar mechanisms are found in patients practising mindfulness. This is a type of training, which significantly improves concentration and conscious action. Patients with IBS have shown a significant reduction in symptoms after undertaking these practices.(Naliboff et al., 2020; Pourkazem et al., 2024)

Physical activity

Physical activity is inextricably linked to the physical and mental well-being of every human being. It has a significant impact on the functioning of the digestive tract. It is associated not only with improved intestinal motility, but also with reduced inflammation and immune modulation, strengthening the intestinal barrier and thus improving its overall condition (Rojas-Valverde et al., 2023). In addition, exercise promotes the maintenance of intestinal eubiosis by stimulating the proliferation of ‘good’ intestinal bacteria and stimulating the intestines to produce protective substances (Wegierska et al., 2022). The greatest role in reducing IBS symptoms, mainly abdominal pain and bloating, is attributed to moderate, regular aerobic physical activity – walking, running, cycling, swimming, aerobics. It is this activity that ensures the diversity and stability of the gut microbiome and significantly reduces stress levels, thereby improving mood and overall quality of life (Bianco et al., 2023; Groenendijk et al., 2022; Li et al., 2024). In addition, yoga is often mentioned in the literature as a method of controlling symptoms (Pavan et al., 2025; Thakur et al., 2024).

Sleeping and eating habits

It is also important to note the relationship between circadian rhythm and the amount of sleep in people suffering from IBS. It has been shown that shift workers suffer from significantly more severe IBS symptoms (Zhong et al., 2025). In addition, night shift workers are more prone to developing IBS compared to the general population (Lu et al., 2025). Therefore, in this disorder, it is important to ensure adequate sleep and sleep hygiene. Diet plays an important role in recommendations for IBS, but it is also very important to mention food hygiene itself. It has been shown that people who eat irregularly are three times more likely to develop IBS than those with regular eating habits (Guo et al., 2015a).

It is recommended to eat small meals regularly and avoid heavy, high-fat foods and products that cause bloating (peas, beans). It is important to stay hydrated and avoid alcohol, caffeine and sweeteners (especially in the case of IBS-D) (Cozma-Petruţ et al., 2017).

DISCUSSION

Irritable bowel syndrome is a complex medical problem. Its pathomechanism is still not fully understood and the variety of symptoms can hinder rapid diagnosis. A number of scientific studies emphasize the impact of diet on the onset and course of the disease. The best-studied dietary intervention is the introduction of the Low FODMAP diet (Khalighi Sikaroudi et al., 2024). However, it is not without its drawbacks, mainly due to significant dietary restrictions, which can lead to nutrient deficiencies and malnutrition. In addition, there is increasing talk about the costs and difficulties of adhering to dietary guidelines, especially without the help of a qualified dietitian. It is suggested that professional advice increases the safety of such a restrictive diet and its benefits (Bellini et al., 2020). In light of current scientific evidence, it is advisable to recommend general principles of healthy eating to patients, which form the basis for reducing the severity of symptoms. In addition, scientific studies confirm the effectiveness of the Mediterranean diet, which has anti-inflammatory properties (Kuczka et al., 2025). Probiotics are currently the best-studied pharmacological treatment for irritable bowel syndrome. However, it should be noted that there are still discrepancies among clinical guidelines regarding the proven effectiveness of probiotics, their specific strains, and combinations (Wu et al., 2024). Future RCTs should focus more on selected specific species and strains in order to develop the most optimal treatment strategies (Goodoory et al., 2023). Herbal therapy may potentially be used as a complementary treatment in patients with IBS, but the quality of scientific evidence in systematic reviews is generally quite low, and further and

more detailed clinical studies are needed (Abalo et al., 2025; Jun et al., 2022). More and more studies are focusing on non-pharmacological strategies for treating IBS. Given the holistic approach to health and the complex pathomechanism of the disease, it seems reasonable to look for solutions that combine physical and mental health. Current scientific evidence suggests increased stress reactivity in patients with irritable bowel syndrome, but it remains unclear whether this can be attributed mainly to the syndrome or to the high prevalence of coexisting mental disorders (Schaper & Stengel, 2022).

Nevertheless, regardless of the type of psychotherapy, it is associated with a significant improvement in the clinical condition of patients (Black et al., 2020; Fernandes et al., 2024). Physical activity, especially regular moderate-intensity exercise, mindfulness practice, and meditation are highly effective in alleviating symptoms. The importance of healthy eating and sleep cannot be overlooked. There is still a need for more high-quality scientific evidence examining the eating habits of people with IBS both before and during the onset of the disease. Nevertheless, some studies point to the important role of regular meals, eating in a calm environment, focusing on slow chewing, and limiting audiovisual stimuli while eating (Bavani et al., 2022; Guo et al., 2015b).

Despite its prevalence and significant impact on patients' quality of life and the burden on the healthcare system, irritable bowel syndrome still requires additional high-quality research, especially in the area of nutrition and non-pharmacological treatments.

CONCLUSIONS

Irritable bowel syndrome is a complex problem, and the pathomechanism behind some of its symptoms remains unclear. This significantly hinders the search for a treatment for patients suffering from IBS. Many studies focus on nutrition and point to a significant link between dietary changes and symptom reduction, with the Low FODMAP diet in particular being recognized as effective. However, it is important that it is followed strictly and under the supervision of a dietitian, as this allows nutritional deficiencies resulting from severe dietary restrictions to be avoided. It should be noted that the low FODMAP diet is a short-term intervention, which should aim to identify products that exacerbate symptoms and possibly eliminate them, rather than completely avoiding FODMAPs in the long term. In addition, it is worth including probiotics and considering antidepressants. The rest of the above-mentioned medications apply to specific subtypes of IBS and should be selected on an individual basis. It would be advisable to determine the vitamin D level in each patient and select appropriate

supplementation depending on the result. It seems reasonable to include herbal preparations, specifically peppermint oil, in the therapy. More and more studies emphasize the role of a generally healthy lifestyle, stress management, mindfulness, and meditation. IBS patients who also suffer from depression or anxiety disorders may benefit significantly from psychotherapy, especially cognitive-behavioral therapy.

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In preparing this work, the authors used Gemini for the purpose of improving language and readability, text for matting, and verification of bibliographic styles. After using this tool/service, 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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