International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	HOW CAN WE IMPROVE SYMPTOM CONTROL AND QUALITY OF LIFE IN IBS PATIENTS? – INSIGHTS INTO THE ROLE OF LOW-FODMAP DIET, PHYSICAL ACTIVITY, AND OTHER KEY LIFESTYLE DETERMINANTS
DOI	https://doi.org/10.31435/ijitss.3(47).2025.3880
RECEIVED	27 July 2025
ACCEPTED	18 September 2025
PUBLISHED	22 September 2025
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HOW CAN WE IMPROVE SYMPTOM CONTROL AND QUALITY OF LIFE IN IBS PATIENTS? – INSIGHTS INTO THE ROLE OF LOW-FODMAP DIET, PHYSICAL ACTIVITY, AND OTHER KEY LIFESTYLE DETERMINANTS

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ABSTRACT

Introduction, purpose: Irritable bowel syndrome (IBS) is a prevalent functional gastrointestinal disorder marked by chronic abdominal pain and altered bowel habits without clear structural abnormalities. It often coexists with psychological distress and lifestyle-related challenges, significantly reducing patients' quality of life. This paper explores dietary, physical, psychological, and environmental factors that influence IBS symptom severity and progression, with emphasis on their impact on well-being.

Key topics include the role of diet—particularly the low-FODMAP approach—and its effects on symptom relief and gut microbiota, as well as potential risks like nutrient deficiencies. The analysis also considers the benefits of regular physical activity, not only in reducing symptoms but in improving mood and quality of life. Additionally, links between poor sleep, chronic stress, and alcohol intake are addressed.

Materials and methods: A systematic literature review was conducted using the PubMed database to explore the current state of knowledge regarding IBS, with particular focus on impact of lifestyle.

Conclusion: The findings underscore the importance of a multidisciplinary approach to IBS treatment, integrating both clinical and lifestyle strategies. Personalized dietary interventions, regular physical activity, effective stress management, adequate sleep, and moderation in alcohol intake should be viewed as essential, not optional, components of care. Together, these elements offer a comprehensive strategy that not only improves symptom control but also supports long-term health and enhances patients' overall quality of life.

KEYWORDS

Irritable Bowel Syndrome, Low-FODMAP Diet, Gut Microbiota, Physical Activity, Stress, Sleep, Alcohol

CITATION

Stachura Piotr, Wilk Bernadetta, Rejman Piotr, Witkowska Edyta, Ciechański Marcin, Cholewiński Szymon, Wilk Klaudia, Jurkiewicz Katarzyna, Kasprzyk Aleksandra, Pszczoła Katarzyna. (2025) How Can We Improve Symptom Control and Quality of Life in IBS Patients? – Insights Into the Role of Low-FODMAP Diet, Physical Activity, and Other Key Lifestyle Determinants. *International Journal of Innovative Technologies in Social Science*. 3(47). doi: 10.31435/ijitss.3(47).2025.3880

Introduction

Irritable bowel syndrome (IBS) is one of the most frequently diagnosed functional gastrointestinal disorders (FGDs). It is characterized by chronic and recurrent abdominal pain and discomfort, accompanied by altered bowel habits. These symptoms occur in the absence of any detectable organic gastrointestinal disease, which significantly complicates the diagnostic process. [1] Patients suffering from IBS tend to use healthcare services more frequently for hospitalization, diagnostics, and treatment, and they also consume more medications compared to healthy individuals. This has a substantial impact on their work productivity and overall quality of life. [2]

Although a significant proportion of patients do not seek medical attention, IBS still accounts for 20% to 50% of gastroenterology clinic visits. [3][4] Globally, the condition affects 5%–10% of the population and is more prevalent among women. Most cases develop in early childhood, although peak incidence is observed in young adulthood. [1][5]

Diet

Studies clearly indicate that a diet rich in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) leads to increased water influx into the intestinal lumen and an increase in the volume of intestinal contents, resulting in osmotic diarrhea. Additionally, due to limited absorption of these sugars in the small intestine, they undergo fermentation in the colon, leading to excessive gas production and luminal distension. [5]

The use of elimination diets—such as the low-FODMAP diet, gluten-free diet, and adherence to traditional dietary recommendations (including the consumption of small, regular meals, avoidance of trigger

foods, and limitation of alcohol and caffeine intake)—has been shown to significantly alleviate the symptoms of irritable bowel syndrome (IBS). Diet plays an important role not only in reducing gastrointestinal complaints but also in improving the quality of life of IBS patients. Some studies suggest that specific food groups may stimulate histamine release and trigger intestinal inflammation, potentially exacerbating disease symptoms. [6][7][8]

To effectively assess the relationship between dietary intake and IBS-related symptoms, it is essential to conduct a detailed dietary history, covering both the types of foods consumed and the patient's eating habits. Given the frequent co-occurrence of eating disorders among individuals with gastrointestinal complaints—often remaining undiagnosed—routine screening should be an integral part of the diagnostic process. This is particularly important in the context of the dietary limitations that eating disorders may impose on the effectiveness of nutritional therapy. Cooperation with a psychologist specializing in brain–gut axis disorders can greatly support the identification and treatment of abnormal eating patterns. A food diary is also a useful tool for assessing the relationship between diet and the severity of IBS symptoms, as it allows for tracking potential correlations between specific foods and the onset of complaints. [9][10]

Implementation of a low-FODMAP diet can follow two main strategies: the top-down approach and the bottom-up approach. The top-down approach consists of three phases: initial elimination of all FODMAP-rich foods, followed by gradual reintroduction to assess individual tolerance, and finally personalization of the diet based on these results. Alternatively, the bottom-up approach begins with limiting only certain groups of FODMAPs, with further eliminations introduced if necessary. Most available studies confirm the higher effectiveness of the top-down method in relieving IBS symptoms, making it the recommended dietary intervention in clinical practice. [11][12]

A network meta-analysis evaluating the effectiveness of various dietary interventions in IBS management—including the low-FODMAP diet, dietary guidelines from the British Dietetic Association (BDA) and the National Institute for Health and Care Excellence (NICE), as well as alternative dietary schemes—showed that the low-FODMAP diet was the most effective in reducing overall IBS symptoms. Compared to it, the NICE/BDA guidelines were less effective in alleviating symptoms such as bloating or its intensity. Moreover, the FODMAP diet also had a greater impact on reducing abdominal pain severity compared to a sham diet group. [11]

Despite the documented effectiveness of the low-FODMAP diet in alleviating IBS symptoms, its use also carries certain limitations and potential risks. One significant concern is the reduced intake of dietary fiber, which in some patients may worsen constipation-related symptoms. [13] Furthermore, the restrictions introduced in the initial phase of the diet can negatively affect patients' mental well-being. Anxiety over potential symptom exacerbation and dietary limitations may contribute to the development of disordered eating behaviors. [14]

In particular, avoidant/restrictive food intake disorder (ARFID) and orthorexia are the most commonly observed eating disturbances in the context of FODMAP diet adherence. [14][15] Therefore, this diet is not recommended for patients with coexisting eating disorders. [15][8] A preliminary nutritional risk assessment is also advised before implementing the diet.

Additionally, cognitive limitations and the presence of severe psychiatric conditions may significantly hinder patients' ability to correctly identify trigger foods, adhere consistently to dietary recommendations, and accurately report clinical symptoms.

Diet and Gut Microbiota

A diet poor in essential nutrients and low in diversity reduces the availability of substrates necessary for the growth of beneficial gut microorganisms. As a result, this can lead to dysbiosis—characterized by a depletion of beneficial bacterial populations and the overgrowth of pathogenic species. Although it is difficult to precisely identify which dietary components adversely affect the gut microbiome, both short- and long-term dietary changes are known to significantly influence its composition. There is also evidence linking gut microbiota to the functioning of the host's autonomic nervous system. [3][17]

Chronic consumption of high amounts of carbohydrates, protein, and animal fats has been associated with an increased abundance of bacteria from the genus *Prevotella.* [17] The typical Western diet—rich in processed, fried, fatty, and sugary foods—tends to reduce microbial diversity in the gut. In contrast, dietary interventions such as the low-FODMAP diet and traditional dietary advice (TDA) have shown not only clinical improvement in IBS symptoms but also favorable modulation of microbiota composition. [17][18][19]

High intake of saturated fatty acids (SFA) can lead to a reduction in total bacterial counts while paradoxically increasing microbial diversity [20]. Conversely, plant-based and Mediterranean diets promote the growth of beneficial bacteria and greater microbiological diversity. Excessive fat consumption may also decrease the abundance of *Lactobacillus* species and increase *Firmicutes*, contributing to increased intestinal permeability. [18][21][22]

A fiber-rich diet supports the growth of beneficial gut bacteria while simultaneously inhibiting the proliferation of pathogenic microbes. [19] Fiber intake stimulates the growth of bacteria capable of hydrolyzing it, thereby enhancing microbial diversity. [18] Cellulose, in particular, has been shown to influence not only the composition of the microbiota but also its enzymatic profile. [19]

Fermentation of indigestible fiber fractions by gut microbes produces short-chain fatty acids (SCFAs), such as butyrate and propionate, which play crucial physiological roles. These SCFAs act on intestinal endocrine cells, stimulating the secretion of compounds such as glucagon-like peptide-1 (GLP-1) and peptide YY (PYY). These, in turn, affect hypothalamic regulatory centers, modulating appetite and contributing to the maintenance of the body's energy balance. [8][23][24]

Physical Activity

An increasing number of studies indicate a significant relationship between physical activity and the occurrence and course of irritable bowel syndrome (IBS). Regular exercise is recognized as a protective factor and may alleviate symptoms of the disorder. One study conducted among Iranian adults showed that individuals with the highest levels of physical activity had a 21% lower risk of developing IBS compared to those with the lowest levels (Sadeghian et al., 2018). These findings suggest that movement may play a preventive role in functional gastrointestinal disorders.

Mechanisms through which physical activity influences IBS symptoms include improved intestinal motility, stress reduction, and beneficial modulation of the gut microbiota. Exercise may also counteract low-grade inflammation and enhance the balance of the autonomic nervous system, which is particularly important in IBS patients who often exhibit dysregulation of the brain–gut axis.

According to available clinical data, organizations such as the National Institute for Health and Care Excellence (NICE) and the British Society of Gastroenterology recommend moderate, regular physical activity (e.g., brisk walking, swimming, yoga) as an integral part of IBS management. Importantly, the benefits of physical activity relate not only to the somatic aspects of the disease but also to mental well-being, improving both digestive function and quality of life. [24]

Studies involving healthy adults have demonstrated that physical activity may enhance mood and reduce symptoms such as fatigue, bloating, and constipation. [25] Moreover, a recent randomized controlled trial confirmed that exercise is particularly effective in relieving constipation-related symptoms. [26] However, despite many studies supporting the beneficial role of exercise in managing IBS, there is still no clear consensus regarding the optimal type, intensity, or duration of physical activity for these patients.

In some individuals, intense physical exertion may act as a stressor for the gastrointestinal tract, potentially exacerbating symptoms. Military training is one example, where high-intensity exercise can aggravate GI complaints. In one study, male recruits engaged in more intensive physical activity and military training than female recruits; however, no significant differences in the severity of gastrointestinal symptoms were found between the sexes. These results suggest that appropriately dosed, moderate physical activity may provide therapeutic benefits for IBS. [27]

In Sweden, two controlled trials were conducted to assess the effect of physical activity on the course of IBS. In one study, participants were followed for 12 months, while the other had a median follow-up of 5.2 years. Both studies showed that engaging in moderate to high-intensity physical activity (e.g., brisk walking, cycling, aerobics) for 20–60 minutes, three to five times per week, led to marked improvement in gastrointestinal symptoms. Additionally, participants in the intervention groups reported significantly better quality of life and lower levels of anxiety and depression compared to controls who maintained sedentary lifestyles. [28][29]

In light of previous findings, it is worth referring to the Cochrane systematic review on physical activity in IBS. This review included 11 randomized controlled trials involving 622 adults with diagnosed IBS, examining various physical interventions such as yoga, treadmill walking, strength training, and physical activity counseling.

The findings suggest that physical activity may improve overall IBS symptoms compared to standard care. However, due to the very low quality of evidence—stemming from risk of bias, heterogeneity, and imprecise data—confidence in these results remains limited.

Regarding quality of life and abdominal pain, the review did not identify consistent benefits from physical activity. While some studies reported slight improvements, these results were not conclusive due to small sample sizes and methodological differences.

In summary, while physical activity appears to be a promising component of IBS management, current evidence is insufficient to establish precise recommendations regarding the type, intensity, or duration of exercise. Further well-designed studies are needed to better understand the potential benefits and limitations of physical activity for IBS patients. [30]

Stress

The term”stress" as a medical concept was first introduced in 1936 by endocrinologist Hans Selye, who defined it as the physiological response of the body to threats—both real (physical) and perceived (psychological). [31][32] This definition was based on observations of the body’s adaptive reactions to various stressors. [32] Once the stressor subsides, a negative feedback mechanism is activated to suppress the stress response and restore the body to a state of equilibrium—homeostasis. However, when stress becomes chronic or exceeds the body's adaptive capacity, it can become harmful, as physiological balance can no longer be maintained. In modern societies, psychological stress has become more prevalent than physical stress and typically stems from social and emotional factors. These sources are often subjective and can vary greatly depending on an individual’s personal sensitivity. [32][33]

In response to stress, the corticotropin-releasing factor (CRF) system activates the hypothalamic–pituitary–adrenal (HPA) axis and affects the autonomic nervous system. This leads to sympathetic activation, catecholamine release, and suppression of parasympathetic activity. CRF functions as a neurotransmitter, coordinating the body’s stress response both at the immunological and visceral levels. [33]

Additionally, stress—either directly or indirectly—affects the composition and development of the gut microbiota, which plays a crucial role in the bidirectional communication within the brain–gut axis. [31] The impact of stress on this axis has been extensively discussed in reviews by Grenham et al. [34] and O’Malley et al. [35]

Effector cells such as mast cells, enterochromaffin (EC) cells, and lymphocytes are also believed to play an important role in stress-induced intestinal changes. These elements, along with mediators such as proteases, 5-HT (serotonin), and pro-inflammatory cytokines, participate in the mucosal immune response. Located in the lamina propria and mucosal layers, these cells are key players in defending against allergens and infections. In IBS patients, immune system activation is more commonly observed, leading to neuronal sensitization of mucosal fibers and activation of previously silent nociceptors. [36][37]

In recent years, the role of the gut microbiota in the pathogenesis of irritable bowel syndrome (IBS) has attracted increasing attention. As a natural reservoir of microorganisms, the gastrointestinal tract performs important metabolic, protective, and structural functions. Disruptions in the composition and functioning of the microbiota—referred to as dysbiosis—may contribute to the development of various diseases, including IBS. [38]

The coexistence of IBS and mental disorders is also common. It is estimated that between 40% and 60% of IBS patients suffer from at least one psychiatric condition, with some studies reporting rates as high as 80%. [39] A strong correlation has been observed between the severity of IBS symptoms and coexisting psychological disorders, particularly depression and anxiety. [35][40]

A literature review on psychosocial factors in IBS, published in 2013 [41], found that individuals transitioning from a non-IBS state to being diagnosed with the condition often experienced a marked increase in stress levels immediately before symptom onset. Moreover, major life events—such as the loss of a close relationship, marital separation, a family member leaving home, or the breakup of a significant romantic relationship—were frequently reported up to 38 weeks prior to the appearance of gastrointestinal symptoms. [42]

There is strong evidence supporting the link between IBS and stress, which highlights the importance of incorporating stress-reduction strategies into treatment. Given the limited effectiveness of conventional pharmacotherapy, non-pharmacological approaches—such as patient education, psychotherapy (including hypnotherapy and cognitive-behavioral therapy), dietary changes, physical activity, and relaxation techniques like biofeedback—are gaining increasing attention. [43]

Sleep

A systematic review and meta-analysis conducted by Wang, Duan, and Duan (2018) demonstrated that sleep disturbances are significantly more common in patients with irritable bowel syndrome (IBS) compared to the general population. The analysis, which included 36 studies, indicated that individuals with IBS are over three times more likely to experience sleep-related issues. The most frequently reported difficulties included sleep fragmentation, trouble falling asleep, and non-restorative sleep. The authors emphasized that the relationship between sleep disturbances and IBS symptoms may be bidirectional—chronic abdominal discomfort can impair sleep quality, while insufficient or poor-quality sleep may exacerbate IBS symptoms. These findings suggest the need to include sleep assessment and treatment as an integral part of IBS management. [44]

The association between sleep quality and IBS symptom severity was also confirmed in a study involving 142 patients meeting the Rome III criteria. The results showed that poorer sleep quality—measured using the Pittsburgh Sleep Quality Index (PSQI)—was significantly correlated with higher IBS symptom severity, assessed with the IBS Symptom Severity Score (IBS-SSS). The strength of this correlation was moderate but statistically significant ($r = 0.45$; $p < 0.05$). Furthermore, it was observed that younger patients (≤50 years) more frequently reported severe gastrointestinal symptoms, while older individuals tended to experience more pronounced sleep disturbances. Lifestyle factors also influenced the severity of both IBS symptoms and sleep problems: higher coffee consumption was associated with milder IBS symptoms, whereas moderate alcohol intake and female sex were linked to less severe sleep disturbances. These results highlight the importance of considering sleep quality as part of a comprehensive therapeutic strategy for IBS patients. [45]

A 2021 study also confirmed that sleep disturbances are more prevalent among individuals with IBS and functional dyspepsia (FD) compared to the general population. The analysis included 1, 322 Australian adults, 10.4% of whom met the Rome III criteria for IBS and 17.9% for FD. Sleep disturbances were reported by 41.8% of participants with IBS and/or FD, compared to 32.2% in the control group ($p = 0.003$). Notably, this correlation remained significant even after adjusting for psychological factors such as stress and anxiety, suggesting that sleep disturbances may play an independent role in the pathophysiology of IBS.

These findings underscore the need to consider sleep quality in the comprehensive assessment and treatment of IBS patients, as it may contribute to more effective symptom management and improved overall well-being. [46]

Alcohol

Research indicates a significant association between alcohol consumption and the severity of irritable bowel syndrome (IBS) symptoms. In particular, excessive alcohol intake may exacerbate gastrointestinal complaints in individuals with IBS.

In one observational study involving women diagnosed with IBS and a control group, participants recorded their daily alcohol intake and gastrointestinal symptoms over the course of approximately one month. The findings showed that in women with IBS, consumption of four or more alcoholic drinks per day (classified as heavy drinking) was significantly associated with increased incidence of symptoms such as diarrhea, nausea, abdominal pain, and indigestion the following day. In contrast, moderate or light alcohol consumption had a weaker or statistically insignificant effect on symptom severity. This correlation was especially pronounced among patients with diarrhea-predominant IBS (IBS-D).

Furthermore, a retrospective cohort study conducted in Taiwan found that individuals diagnosed with alcohol use disorder (AUD) had a significantly higher risk of developing IBS compared to those without AUD. This risk increased with the severity of AUD, suggesting a dose–response relationship between alcohol intake and the likelihood of developing IBS. [47]

In summary, there is evidence that excessive alcohol consumption can worsen IBS symptoms and may increase the risk of developing the condition. It is therefore recommended that individuals with IBS limit their alcohol intake—particularly in large quantities—to help reduce symptoms and improve overall quality of life.

Conclusions

Irritable bowel syndrome is a complex disorder influenced by a wide range of interconnected factors, including diet, gut microbiota, psychological stress, physical activity, sleep quality, and alcohol consumption. The evidence discussed in this paper highlights the importance of a holistic, individualized approach to managing IBS. While no single treatment offers universal relief, combining dietary modifications, lifestyle interventions, and psychological support shows promise in reducing symptom severity and improving patient well-being. Further interdisciplinary research is essential to develop more precise, patient-centered therapeutic strategies and to better understand the underlying mechanisms linking the brain, gut, and behavior.

Disclosure

Authors do not report any disclosures.

Author's contributions

Conceptualization, Piotr Stachura, Bernadetta Wilk, Edyta Witkowska; methodology, Piotr Stachura, Bernadetta Wilk, Edyta Witkowska; software, Bernadetta Wilk, Szymon Cholewiński, Marcin Ciechański, Piotr Rejman; check, Katarzyna Jurkiweicz, Katarzyna Pszczoła, Aleksandra Kasprzyk; formal analysis, Piotr Stachura, Edyta Witkowska, Klaudia Wilk, Marcin Ciechański; investigation, Piotr Rejman, Edyta Witkowska, Bernadetta Wilk; resources, Szymon Cholewiński, Marcin Ciechański; data curation, Katarzyna Jurkiewicz, Katarzyna Pszczoła, Klaudia Wilk; writing - rough preparation, Aleksandra Kasprzyk, , Szymon Cholewiński, Klaudia, Wilk, Piotr Rejman, Katarzyna Jurkiewicz; writing - review and editing, Katarzyna Jurkiewicz, Marcin Ciechański, Katarzyna Pszczołą, ; visualization, Piotr Rejman, Szymon Cholewiński; supervision, Piotr Stachura, Aleksandra Kasprzyk, Bernadetta Wilk; project administration, Katarzyna Pszczoła, Aleksandra Kasprzyk

All authors have read and agreed with the published version of the manuscript.

Funding Statement: This research received no external funding.
Institutional Review Board Statement: Not applicable
Informed Consent Statement: Not applicable
Data Availability Statement: Not applicable
Acknowledgments: Not applicable
Conflict of Interest Statement: The authors declare no conflict of interest.

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