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IRRITABLE BOWEL SYNDROME: A COMPREHENSIVE REVIEW OF CURRENT KNOWLEDGE

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ABSTRACT

Introduction and purpose: Irritable bowel syndrome (IBS) is a chronic intestinal disorder and a prevalent disorder of gut-brain interaction (DGBI) that significantly impairs daily functioning and quality of life. While the exact pathophysiology is not fully understood, a multifactorial etiology involving biological, genetic, and psychological influences is postulated. This review aims to condense findings from various studies into a single, accessible overview, emphasizing practical strategies for diagnosis and treatment.
Materials and methods: This review analyzed 34 articles published between 1973 and 2026, identified through an extensive PubMed search. The timeframe bridges historical clinical accounts with contemporary research. The study focused on synthesizing data related to diagnostic protocols and current treatment strategies.
Description of the state of knowledge: Diagnosis currently utilizes the 2016 Rome IV criteria, which prioritize recurrent abdominal pain associated with changes in bowel frequency or stool consistency. IBS is categorized into four subtypes based on the Bristol Stool Form Scale: IBS-C, IBS-D, IBS-M, and IBS-U. Pathophysiological factors include genetic mutations, and psychological distress, which affects up to 80% of patients. Management involves lifestyle changes like increased physical activity, dietary modifications such as the Low FODMAP diet, and psychological therapies including specialised CBT and hypnotherapy. Pharmacotherapy is tailored to the clinical subtype, utilizing antispasmodics, laxatives, and antidepressants.
Conclusions: IBS management remains challenging due to high individual variability and frequent relapses. Sustained remission requires a multidisciplinary strategy addressing both somatic manifestations and the significant psychological burden of the disorder.

KEYWORDS

Irritable Bowel Syndrome; Gut-Brain Interaction; Rome IV Criteria

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Introduction and purpose

Irritable bowel syndrome (IBS) is a chronic intestinal disorder with a steadily increasing global prevalence. It is recognized as one of the two most common disorders of gut-brain interaction (DGBI), producing symptoms that significantly impair daily functioning and quality of life for patients. Although the condition has been studied extensively, its precise pathophysiology remains incompletely understood, and a multifactorial etiology is postulated. Prevalence varies significantly by country, and the diverse severity of symptoms often poses diagnostic challenges due to clinical overlap with other gastrointestinal diseases. Consequently, diagnosis is primarily based on the identification of specific symptom clusters. Management strategies prioritize symptomatic relief and improved quality of life through a generally healthy diet and increased physical activity. Parallel to these gastrointestinal symptoms, patients frequently exhibit comorbid symptoms of depression and anxiety. To illustrate the socioeconomic burden, the total annual costs associated with IBS in Europe are estimated to reach as much as 8 billion euros. The goal of this review is to condense findings from a wide range of studies into a single, accessible overview, placing a strong emphasis on practical strategies for diagnosis and treatment [1,3].

Methodology

To provide a comprehensive synthesis of current knowledge on Irritable_Bowel Syndrome (IBS), this review analyzed 34 articles published between 1973 and 2026. The chosen timeframe encompasses both the historical foundations of the disease and the most recent breakthroughs, ensuring a comprehensive perspective that bridges early clinical accounts with contemporary research. These sources were identified through an extensive search of PubMed. The research focused on synthesizing data related to the pathophysiology, clinical features, and diagnostic protocols of IBS, as well as current treatment strategies.

Pathophysiology

The etiology of Irritable Bowel Syndrome is multifactorial, involving a complex interplay between biological, genetic, and psychological influences [4].

Genetic factors

Evidence from twin studies suggests a hereditary component to IBS [6,7]. Mutations in the SCN5A gene encoding sodium channels in gastrointestinal smooth muscle and interstitial cells of Cajal have been linked to abdominal pain [8,9].

Psychological factors

Psychological distress is a defining feature of IBS pathophysiology, with psychiatric comorbidities like anxiety and depression affecting up to 80% of patients and directly correlating with symptom severity [16]. The onset of the disorder is frequently preceded by significant life stressors or major emotional traumas [17].

Chronic stress is postulated to alter bacterial adhesion within the intestinal mucosa, thereby disrupting the regulatory signaling of the gut-brain axis [13].

Biological mechanisms

Altered gut-brain signaling remains a central mechanism, manifesting as disordered motility and visceral hypersensitivity [10,11]. Metabolic shifts within the intestinal environment, particularly involving serotonin and short-chain fatty acids, play a significant role in symptom provocation [5,14]. Additionally, alterations in the gut microbiota likely contribute to the pathogenesis of the disease [15].

Epidemiology

Irritable bowel syndrome affects between 5% and 10% of the population [2]. Depending on the studies conducted in specific countries, the prevalence ranges from 1.1% in France and Iran to 35.5% in Mexico. It is suggested that this difference is due to variations in research methodology, as well as genetics and diet [12]. While women in Western countries are more likely to be affected, IBS impacts men and women in Eastern countries in similar proportions. Furthermore, the prevalence of the disorder tends to decrease with advancing age [18,19].

Clinical presentation and diagnosis

In the past, the diagnosis of IBS was based on ruling out other conditions that could cause similar symptoms. This approach evolved, starting with the identification of six characteristic symptoms by Manning et al. in 1978, moving through the statistical regression model developed by Kruis and his team in 1984, which quantified clinical symptoms and biochemical tests, and culminating in the Rome criteria, of which four versions have been published [20]. Several clinical symptoms remained consistent across all proposed diagnostic criteria: abdominal pain relieved by defecation, along with changes in both stool frequency and consistency. Several features were excluded from the more recent diagnostic criteria, such as abdominal bloating or distension, the presence of mucus in the stool, and the sensation of incomplete evacuation. Additionally, laboratory markers such as erythrocyte sedimentation rate, white blood cell count, and hemoglobin levels were no longer formally included in the primary diagnostic sets [21]. Currently, the 2016 Rome IV criteria are used to diagnose IBS. IBS is classified into four subtypes based on the predominant bowel habit pattern, as assessed using the Bristol Stool Form Scale (BSFS) during days with at least one abnormal bowel movement(Table 1) [23].

Table 1. Classification of IBS Subtypes [23].

Subtype	BSFS	Frequency of abnormal bowel movements
IBS-C	1 or 2	>25%
IBS-D	6 or 7	>25%
IBS-M	1 or 2 and 6 or 7	>25% of each type
IBS-U	1 or 2 and 6 or 7	<25% of each type

Compared to the previous Rome III criteria from 2006, they have significantly higher specificity with comparable sensitivity, which greatly helps in distinguishing between those who are healthy and those who are not [22]. According to the latest criteria, the main symptom is recurrent abdominal pain that has occurred at least one day a week for the past 3 months. The abdominal pain must be associated with at least 2 of the following: pain associated with defecation, a change in bowel frequency, or a change in stool consistency. To confirm the diagnosis, these symptoms must have started at least six months prior and have been consistently present for the last three months [24].

Although there are clearly established criteria for diagnosing IBS based on clinical symptoms, other conditions with a similar clinical presentation must also be ruled out in certain cases. Colonoscopy is indicated for patients aged 45 or older, as well as for those of any age presenting with alarm features such as unexplained iron deficiency anemia, rectal bleeding, unintentional weight loss, fever, or abnormal physical findings [25].

Management

The most important aspect of treating IBS is making the patient aware that it is a chronic condition, and that treatment is primarily aimed at minimizing symptoms and improving quality of life [26].

Exercise

Staying active with walking, aerobics, and cycling for a median of 5.2 hours a week led to significant clinical improvements in IBS symptom severity. These lifestyle changes were also associated with enhanced mental health outcomes and a measurable increase in overall quality of life [26]. Studies show that yoga can be just as effective as medication for relieving the symptoms of IBS [27].

Dietary therapies

All patients should be advised to adopt healthy dietary habits, such as eating at regular times throughout the day, maintaining a proper balance of macronutrients, and minimizing the intake of alcohol, fatty and spicy foods [29]. Additionally, while some patients may not test positive for lactose intolerance, limiting lactose can still be beneficial as it reduces the osmotic load and gas production that often triggers IBS symptoms [30]. Fiber supplementation should focus on soluble fiber, with intake gradually increased to a target of 30 grams per day. Insoluble fiber should be avoided as it may exacerbate symptoms. The Low FODMAP diet should only be implemented if these initial dietary modifications fail to provide relief. Furthermore, elimination diets based on IgG antibody testing or routine gluten exclusion are not recommended [28,29].

Psychological therapies

Cognitive Behavioral Therapy (CBT) for IBS targets the gut-brain axis to manage symptoms, recognizing that psychological factors significantly influence gastrointestinal function. Unlike traditional CBT for mental health, which may focus on general mood or depression, IBS specific CBT is tailored to dysregulated gut-brain communication and focuses on anxiety centered on bowel related sensations and behavioral patterns.

IBS specific hypnotherapy is one of the most evidence-based treatments available. Its primary goal is to employ deep relaxation techniques that allow patients to regain control over their gastrointestinal function. By using specialized protocols to target specific symptoms, this method works by modulating the gut-brain axis, which helps normalize how the brain processes pain and reduces visceral hypersensitivity [29,31,32].

Pharmacotherapy

The choice of medications used for treatment depends on the symptoms present, and more specifically on the subtype of the disease [1]**.**

Peppermint oil

Menthol, the active component in the oil, has antispasmodic effects in the distal intestine. The exact mechanism of action is unknown, although studies suggest that it blocks calcium channels in smooth muscle [33].

Antispasmodic drugs

Antispasmodics are categorized as either muscarinic receptor antagonists or agents that act directly on the intestinal smooth muscle. By modulating gastrointestinal motility, these agents effectively reduce IBS related pain and cramping. However, their use may be limited by systemic anticholinergic effects, such as dry mouth or blurred vision, which arise from their impact on the parasympathetic nervous system [1].

Laxatives

Macrogols, such as polyethylene glycol, which bind water in the intestines to soften stools and are used to treat constipation, are effective, although they are associated with abdominal pain as a side effect [34].

Opioid agents

These medications target opioid receptors within the gastrointestinal tract to modulate intestinal hyperreactivity and control diarrhea. Loperamide is mainly used to treat diarrhea, while Eluxadoline is used to treat IBS-D. Because their activity is largely localized, they typically maintain a favorable safety profile with few systemic side effects [1].

Prosecretory agents

By targeting specific ion channels, these agents trigger a flow of ions into the intestinal lumen that naturally draws water along with it, effectively acting as osmotic laxatives. They are typically utilized as second-line therapies for constipation, though their use may be limited by common side effects such as nausea or diarrhea [29].

5-HT4 agonists

Tegaserod acts as a selective receptor agonist that stimulates intestinal peristalsis, making it an effective therapy for constipation. However, due to its association with increased cardiovascular risk, its clinical use is strictly limited to specific patient populations under specialized oversight [1].

5-HT3 antagonists

Ondansetron acts as a 5-HT3 receptor antagonist, blocking serotonin receptors in the gastrointestinal tract to modulate intestinal motility. It is utilized to manage diarrhea in both IBS-D and IBS-M subtypes, however, its use requires careful dosage as constipation is a frequently reported side effect [29].

Gut-brain neuromodulators

Antidepressants, specifically from the SSRI, SNRI, and TCA classes, are effective for treating IBS because they modulate the gut-brain axis. Since anxiety and depression, which often occur together with IBS, are significant risk factors for the onset of IBS, treating these underlying psychological symptoms is often a clinical priority. While TCAs have the strongest evidence for efficacy, they require careful monitoring due to their anticholinergic side effects.

Pregabalin, which acts on calcium channel α2δ ligand, reduces abdominal pain, diarrhea, and bloating. Similarly, it causes side effects such as visual disturbances and dizziness [29].

Probiotics and antibiotics

The gut microbiome in patients with IBS may differ from that of the general population. Probiotics containing Lactobacillus, Bifidobacterium, and Escherichia significantly reduced symptoms, although no specific strain is recommended.

Rifaximin is an antibiotic that acts primarily in the intestines. Placebo controlled studies have not shown an increased risk of Clostridium difficile. It is used primarily for IBS-D, although it provides clinical improvement in patients with IBS-C when used in combination with neomycin [29].

Conclusions

The clinical management of IBS remains a significant challenge characterized by frequent relapses and high individual variability, where symptom manifestation often differs across subtypes. Given the prevalence of comorbidities and the side effect profiles of existing therapies, a multidisciplinary care model is essential. Furthermore, the frequent deterioration of mental health following symptom onset underscores the necessity of addressing psychological factors as a core component of treatment rather than a secondary consideration. While the development of novel pharmacological agents targeting specific molecular pathways reflects an advancing understanding of disease pathomechanisms, the periodic refinement of diagnostic criteria highlights the ongoing complexity of accurately identifying and classifying this disorder. Ultimately, achieving sustained symptom remission requires a unified strategy that addresses both the somatic manifestations and the psychological burden of the disorder.

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