Project On

A Systematic Review on Irritable Bowel Syndrome (IBS) & It's Management

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Faculty of Allied Health Sciences,

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In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

Submitted By

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Faculty of Allied Health Sciences

Daffodil International University

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APPROVAL

This project A Systematic Review on Irritable Bowel Syndrome (IBS) & It's Management, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

BOARD OF EXAMINERS

……

Dr. Muniruddin Ahmed

Professor and Head

Department of Pharmacy

Faculty of Allied Health Sciences

Daffodil International University

…… Internal Examiner 1

…… Internal Examiner 2

…… External Examiner

DECLARATION

I, at this moment, announce that I am carrying out this project study under the supervision of "Ms. Farhana Israt Jahan," Associate professor, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, Impartial Compliance with the Bachelor of Pharmacy Degree Requirement (B. Pharm). This project, I declare, is my original work. I also state that neither this project nor any part thereof has been submitted for the Bachelor's award or any degree elsewhere.

Supervised By:

Ms. Farhana Israt Jahan
Associate Professor
Department of Pharmacy
Faculty of Allied Health Sciences
Daffodil International University

Submitted By:

Mahmudul hasan

Md. Mahmudul Hasan
ID: 191-29-165
Department of Pharmacy
Faculty of Allied Health Sciences
Daffodil International University

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Author

Md. Mahmudul Hasan

Abstract

Irritable bowel syndrome (IBS) is a disorder that affects the digestive system that affects many people. Gastric pains, bloating, diarrhea, and constipation are common symptoms of this condition. These tend to come and go throughout time, and they might endure for a few days, a few weeks, or even a few months. It's generally an issue that lasts a lifetime. My aim of this study is, to find out the main reason and possible treatment of IBS. The study is conducted with literature review. I reviewed around 51 articles for this study. In this review, I was found Approximately 35% of cases of IBS were caused by viral infections, mostly norovirus and rotavirus; bacterial infections were around 65% with Campylobacter spp and Salmonella spp. Education, reassurance, stress management, and relaxation methods should all be included in the initial therapy of irritable bowel syndrome. Depending on the nature and degree of symptoms, further treatments may be necessary. Additional fluids, guar gum, exercise, and fiber may be beneficial for those with moderate constipation-predominant IBS who have minor symptoms.

Key words: Irritable Bowel Syndrome, IBS-D, Diseases, FODMAP diet.

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Introduction

1.1.Introduction :

The symptoms of irritable bowel syndrome (IBS), also known as spastic or nervous colon and spastic bowel syndrome, include stomach discomfort and bowel movement alterations. For a long period of time, symptoms may persist for years at a time. ' IBS may be divided into five fundamental categories: IBS-D, IBS-C, IBS-M/IBS-A, or IBS-U. The fifth form, mixed/alternating, comprises both diarrhoea and constipation. [1] IBS is more common in those who have it, and it has a negative impact on their quality of life. It can also make them miss work or school.Anxiety, severe depression, and chronic fatigue syndrome are a few of these conditions.

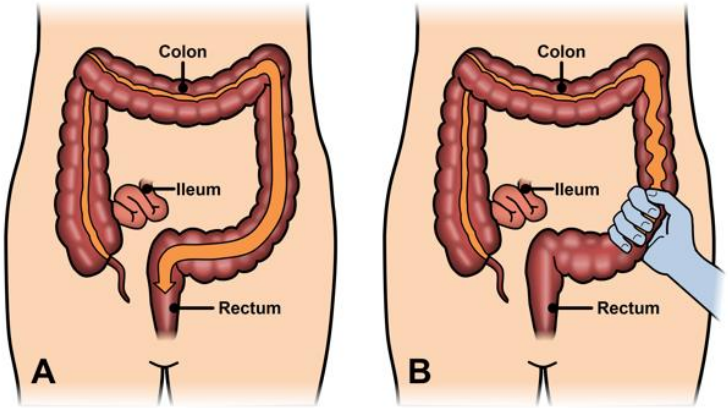

Fig 01: Irritable bowels syndrome

Nobody with IBS goes malnourished as a result of the condition. IBS does not have a known etiology. Potential causes include the gut-brain axis, aberrant gut motility, infections, pain sensitivity, neurotransmitters, genetics, food sensitivities, and other variables.Some people get an intestinal ailments, a stressful life event, or both when they first get IBS. The symptoms and their exclusion from other possible disorders are used to get a diagnosis. Early onset, weight loss, blood in the stool, and an inflammatory bowel disease family history are all recognized warning symptoms. [3] The symptoms mentioned above may coexist with bile acid malabsorption and celiac disease. IBS does not presently have a recognised treatment. Medications and dietary changes may be used to reduce symptoms. Probiotics and treatment are two options for assistance. [4-5] Short-term oligosaccharide diets that are low in fermentable oligosaccharides (FODMAPs) may be used. These diets include oligosaccharides, disaccharides, monosaccharides, and polyols. Laxatives and loperamide are two choices for treating diarrhoea and constipation, respectively.

Antidepressants may relieve other symptoms and aid with pain relief. To provide the greatest treatment possible, doctors and patients must be able to communicate effectively. Adults in affluent nations are thought to have IBS in the range of 10 to 15 percent of the population. Although a pooled estimate of 11.2 percent is based on the findings of many studies, the prevalence of IBS ranges from 1.1 percent to 45.0 percent, according to the findings of various studies. [7]Compared to Southeast Asia, South America has a greater prevalence. The findings show that a woman is twice as likely as a male to get the illness before the age of 45. As we become older, we are less likely to be impacted by it. If you have IBS, your life expectancy won't be lowered. It took 60 years for the ailment to officially be referred to as "irritable bowel syndrome" in medical literature. [9]

1.2.Types of IBS

There are four subcategories of IBS, each with equal prevalence:

A. Mostly diarrhea and abdominal discomfort (IBS-D).
B. Mostly constipation and abdominal discomfort (IBS-C).
C. Alternating loose stools and constipation with abdominal discomfort (IBS-mixed).
D. Undefined subtype (IBS-U) — symptoms vary.

Fig 02:Types of IBS

Mostly diarrhea and abdominal discomfort (IBS-D) :

IBS-D, the medical abbreviation for IBS accompanied by increased diarrhoea, is often used. While IBS-D patients also have more frequent bowel movements than those with typical IBS symptoms, abdominal pain and discomfort are common IBS symptoms. Bowel movements that are erratic are possible but uncommon. Your urge to use the loo might also grow as a consequence. IBS-D cannot be cured, but there are therapies that may help you feel better and live a better life. For years, IBS and IBS-D have baffled scientists. Even while women are more likely to be attacked than men overall, adults under the age of 50 are even more likely to be afflicted than men. Your risk of having IBS is raised if you have a family member who has this condition. IBS makes your intestines more sensitive than they ordinarily would be. It could be brought on by illnesses, stress, or even specific foods. Furthermore, your brain may overreact to gut sensations if it is sensitive to them. As a result, food enters your system too quickly. Bloating and gas are two of the most typical signs. [10-11]

Mostly constipation and abdominal discomfort (IBS-C)

In IBS-C, bloating or stomach pain often coexist with constipation. Inability to pass faeces often (less than three times per week) is a sign of constipation. Firm stools that are challenging to pass or the impression of an incomplete bowel movement are both signs of constipation. IBS-C development may be influenced by a number of variables, say experts. It's conceivable that the colon is absorbing too much stools or that the colon's muscles aren't functioning properly due to sluggish movement. Toxins in the faeces might cause it to become stiff, dry, and challenging to urinate as a result.

IBS-M

Constipation and diarrhea are experienced simultaneously by IBS-M patients (the "M" stands for "mixed"). While diarrhea and constipation are common digestive issues, if they persist over an extended period of time, you may have IBS-M. gastrointestinal sensitivity.7. Issues pertaining to the brain-gut connection 8. It's challenging to find inflammation with a standard physical checkup. an unbalanced bacterial ecology throughout the stomach. [12]

IBS-U

Irritable Bowel Syndrome (IBS) often affects the large intestine. It is possible to have either diarrhea or constipation simultaneously. IBS is a chronic condition, so you'll have to adjust to living with it. [13]

1.3.Signs and symptoms

Some of the most common IBS symptoms

IBS is characterized mostly by the following signs and symptoms:[14-16]

- stomach pain or cramps – Generally speaking, symptoms go worse after a meal and better after a bowel movement.
- bloating – a large and bloated belly may be a symptom
- diarrhea – can have watery poop and need to go unexpectedly from time to time.
- constipation – may feel like you're not able to empty your bowels when you poop

Other symptoms of IBS

IBS can also lead to [17]

- farting (flatulence)
- passing mucus from your bottom
- tiredness and a lack of energy
- feeling sick (nausea)
- backache
- problems peeing, like needing to pee often, sudden urges to pee, and feeling like you cannot fully empty your bladder
- not always being able to control when you poo (bowel incontinence)

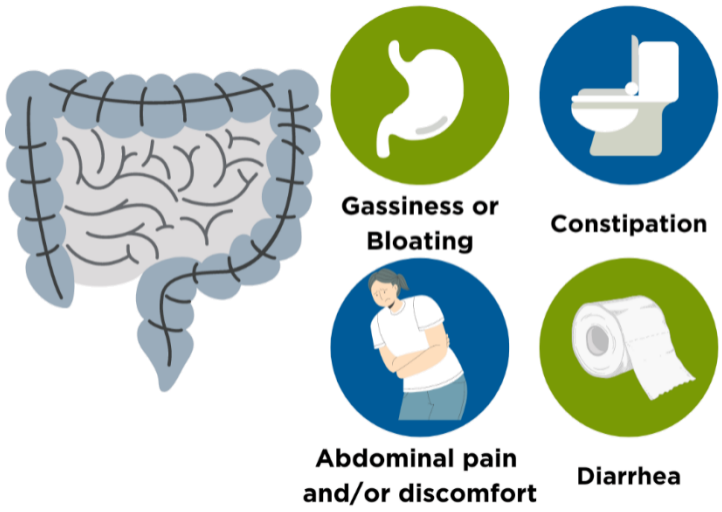

Fig 03: IBS symptoms

1.4.Cause

The whole gut-brain axis is hypothesized to be affected by irritable bowel syndrome (IBS). [18-19] According to recent study, the symptoms of irritable bowel syndrome patients may be related to a peripheral immunological mechanism brought on by allergies. [20]

Risk factors

An acute gastrointestinal infection increases the likelihood of developing IBS by six. Young age, persistent fever, anxiety, and sadness are also post-infection risk factors. [22-23] Irritable bowel syndrome (IBS) may not be caused by psychological disorders such as anxiety or depressive disorders, but they could impact the duration and perceived severity of symptoms. They could, however, exacerbate IBS symptoms and worsen basic wellness and well-being. [24] Antibiotic use has been connected to irritable bowel syndrome (IBS). [25] Recent studies have suggested a relationship between post-infectious and other types of IBS and deficiencies in epithelial homeostasis and innate immunity. [26]

Stress

The brain-gut axis may have a role, according to studies from the 1990s[27], and childhood physical and emotional maltreatment is commonly associated to the development of IBS. [28] Psychological stress may cause a predisposition to IBS. [29] People with IBS usually express high

levels of worry, suggesting that the stress system may be the cause of their sickness. Additionally, their symptoms frequently mimic those of other conditions such as fibromyalgia and chronic fatigue syndrome. The body's abnormal stress response in individuals with irritable bowel syndrome (IBS) is linked to both the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis (HPA). Psychological traits may increase the likelihood of developing IBS after gastroenteritis, and almost two thirds of those suffering from IBS had anxiety or mental health diagnoses before they started experiencing IBS symptoms. [30-31]

Post-infectious

An acute gastroenteritis infection is thought to be the root cause of 10% of IBS symptoms. [32] If the host's antibodies cross-react with vinculin, it is feasible that the host might acquire autoimmunity to CdtB toxin, which is generated by bacteria that cause gastroenteritis. [33] Post-infectious IBS could get worse due to weaknesses in the innate immune system and the epithelial barrier, as well as high levels of stress and concern. Diarrhea is the most common symptom of post-infectious IBS. Acute enteric infection has been demonstrated to increase gut permeability, which allows commensal bacteria to penetrate the epithelium and cause tissue damage that can lead to long-term problems in the gut in those who are at risk. On the other hand, greater intestinal permeability is strongly strongly associated with IBS, regardless of whether an infection caused the condition. There may be a connection between tropical sprue, post-infectious IBS, and small intestine bacterial overgrowth. [34]

Bacteria

When compared to individuals without IBS, patients with IBS have a higher prevalence of SIBO (small intestine bacterial overgrowth). [35] In contrast to healthy controls, SIBO develops more commonly in IBS patients with constipation than in those with diarrhoea as the major symptom. Constipation, diarrhoea, bloating, and stomach pain are all symptoms of SIBO. An abnormal cytokine signalling profile that results from immune system interactions with gut microorganisms may contribute to IBS. [36] Certain bacteria are present in higher or lower levels when compared to healthy people. While Actinomycetota bacteria usually suffer a drop, Bacteroidota, Bacillota, and Pseudomonadota bacteria frequently thrive. The phyla of the human digestive system are similar. The most well-liked is the Bacillota. This includes Lactobacillus, which is thought to have decreased in IBS patients, and Streptococcus, whose abundance has been verified to have

increased. Within this phylum, the number of Clostridia species has expanded, particularly Ruminococcus and Dorea. The Lachnospiraceae family has shown a rise in the number of IBS-D cases. Bacteroidetes is the most abundant phylum in the kingdom of bacteria. There has been evidence of a general decline in IBS patients within the Bacteroidetes phylum, but an increase in the Bacteroides species. According to IBS-D, the phylum Actinomycetota has decreased and the phylum Pseudomonadota has increased, particularly in the family Enterobacteriaceae. [37]

Fungus

Up to 80% of people with IBS have a mental health condition, and dysbiosis, or changes in the gut microbiota, is linked to the intestinal symptoms of IBS. [38] Researchers began examining the role of the gut mycobiota in 2005, focusing in particular on the yeast Candida albicans' abnormal growth in certain IBS patients. [39-41]

Fig 04: Fungus

Protozoa

IBS-like symptoms, such as cramping and discomfort in the abdomen (blastocystosis), may be brought on by certain subtypes of Blastocystis hominis [42], [43–44].Blastocystis colonisation, which seems to occur more often in IBS sufferers, is one of the condition's possible causes.[45] However, Dientamoeba fragilis has also been suggested as a suitable organism to investigate because it can also be found in people without IBS. [46]

Vitamin D

IBS sufferers have a greater incidence of vitamin D deficiency.[47-48] The gut microbiota, immunological responses, inflammatory processes, and psychological variables are all responsive to vitamin D and are involved in the control of IBS triggers. [49]

Genetics

Only a small proportion of IBS patients (IBS-C) have the constipation-predominant form of SCN5A mutations.[50-51] Bowel dysfunction is brought on by the abnormalities, which interferes with the Nav1.5 channel in the pacemaker cells and smooth muscle of the colon.

1.5.Diagnosis

There is no particular laboratory or imaging test that may be used to identify irritable bowel syndrome. It's crucial to consider the patient's symptoms and rule out other illnesses that can present with similar signs and symptoms in order to get a precise diagnosis. [52] Doctors are advised to use medical tests sparingly. [53] Rome criteria are often used. IBS cannot be accurately diagnosed based just on symptoms. [54-55] Weight loss, blood in the stool, and iron deficiency anemia are all indicators that something is amiss if you are over 50 years old. The choice of tests and investigations is influenced by the level of accessible medical resources.

Rome criteria

The Rome IV criteria include recurring abdominal discomfort, on average, at least 1 day/week in the previous 3 months, linked with two or more of the following supplementary criteria:

- Related to defecation
- Associated with a change in frequency of stool
- Associated with a change in form (appearance) of stool

If a physician does not want to use one of these guidelines, they can always go by their own anecdotal experience with previous patients instead. Additional tests may be added to the algorithm to prevent the misdiagnosis of other conditions such as IBS. Symptoms such as weight loss, gastrointestinal bleeding, anemia, or nocturnal symptoms[vague] are all examples of "red flag" symptoms. It is possible that red flag conditions do not always contribute to the accuracy of the diagnosis; for example, up to 31% of people with IBS have blood in their stool, many of whom may have hemorrhoidal bleeding. [56] When a person has diarrhea, abdominal discomfort, and constipation all at once, the diagnostic algorithm recognizes a condition that can be characterized as having these three symptoms at the same time. In this context, travelers who went home with functional diarrhea or IBS would be referred to as "functionally dysentery" and "functionally dysentery," respectively. Others have questioned the system's worth, claiming that all persons with IBS have the same underlying condition despite their symptoms. [57]

Differential diagnosis

Giardiasis, giardiasis, and colon cancer all have abnormal defecation and abdominal pain, as do thyroid disorders (hyperthyroidism or hypothyroidism). It is difficult to justify the expense of testing for these conditions, which include carcinoid syndrome, microscopic colitis, bacteria overgrowth, and eosinophilic gastroenteritis. IBS, on the other hand, is a common presentation, and testing for these conditions would yield low numbers of positive results. [58-60] Conditions like celiac disease, malabsorption of bile acids, cancer of the colon, and dyssynergic defecation may all present in a similar manner. Before making a diagnosis of irritable bowel syndrome, it is recommended to rule out parasitic infections, lactose intolerance, small intestinal bacterial overgrowth, and coeliac disease. Celiac disease can only be diagnosed through an upper endoscopy and small bowel biopsies. [61] Biopsies from an ileocolonoscopy can be used to rule out Crohn's

disease and ulcerative colitis, respectively (Inflammatory bowel disease). [62]Non-celiac gluten sensitivity may be the cause of some people's long-term IBS management (NCGS). Clinically, IBS and NCGS are clinically indistinguishable; however, the following non-intestinal symptoms suggest a possible NCGS: "Foggy mind," "chronic fatigue," "fibromyalgia," and other symptoms of migraine and/or headache Allergies to inhalants, foods, or metals (such as mites, Graminaceae, Parietaria, cat or dog hair, shellfish, or nickel) are among the most common causes of joint and muscle pain, leg or arm numbness,[67-71]tingling of the extremities and dermatitis (or skin rash). depression, anxiety, iron deficiency anemia, asthma, rhinitis, eating disorders (such as schizophrenia and autism), neuropsychiatric conditions (such as peripheral neuropathy and peripheral neuropathy) [73-77] Ataxia, ADHD, or other autoimmune diseases are all possible causes. Once coeliac disease and wheat allergy are ruled out, an improvement in immune-mediated symptoms, including autoimmune diseases, with a gluten-free diet is another way to make a differential diagnosis.

Investigations

I. Microscopy and culture of feces, part one (to exclude infectious conditions)
II. Tests for coeliac disease and liver function include a complete blood examination as well as erythrocyte sedimentation rate and serological testing for coeliac disease
III. Ultrasound imaging of the abdomen, third (to exclude gallstones and other biliary tract diseases)
IV. Biopsies and endoscopy (to exclude peptic ulcer disease, coeliac disease, inflammatory bowel disease, and malignancies)
V. Detection of hydrogen in the breath (to exclude fructose and lactose malabsorption)

Misdiagnosis

IBS can be mistaken for other medical conditions, putting those who suffer from it at greater risk of undergoing unnecessary surgeries like appendectomy, cholecystectomy, and hysterectomy. [78] Infectious diseases, coeliac disease, Helicobacter pylori, and parasites are all examples of frequently misdiagnosed conditions (non-protozoal). [79-81] Every person experiencing symptoms of IBS should be tested for coeliac disease, according to the American College of Gastroenterology. Patients with diarrhea-predominant IBS may also go unnoticed if they have bile

acid malabsorption. D-IBS patients with bile acid sequestrants maybe 30 percent more likely to have this condition, SeHCAT tests show. [82]

Comorbidities

Irritable bowel syndrome (IBS) patients are more likely to have other medical disorders or comorbidities.

- ✓ Neurological/psychiatric: Many people with IBS also suffer from co-occurring conditions such as headache, fibromyalgia, and depression according to a research of 97,593 participants. [88] People with chronic fatigue syndrome and fibromyalgia are more likely to develop IBS, whereas 94% of those with IBS also suffer from mental health issues. Nota punctum
- ✓ Myocardial conduction abnormalities and neuromuscular dysfunction are comorbidities of hereditary channelopathies, which induce IBS and functional GI disorders, as well as variations in GI motility (secretion, sensation) and secretion.[83] Myotonic muscular dystrophies have significant rates of IBS and FBD. For up to ten years before the musculoskeletal signs of dystrophic illness appear, there may be digestive complaints.
- ✓ IBS and inflammatory bowel disease have a small but statistically significant association.
- ✓ If you have Crohn's disease, you may suffer symptoms similar to Irritable Bowel Syndrome (IBS) when your IBD is in remission.[84] In a three-year trial, individuals identified with IBS were 16.3 times more likely to be diagnosed with IBD throughout the study period, however, this is likely owing to an initial mistake.
- ✓ Unnecessary gallbladder removal surgery was more common in people with IBS than in healthy controls because of the higher likelihood of having gallstones, the knowledge of having them, and the incorrect surgical reasons.
- ✓ These individuals are also 87% more likely to have surgery on their abdomens or pelvises, as well as three times more likely to have surgery on their gallbladders.
- ✓ In addition, hysterectomy was twice as common in IBS patients. An endometriosis connection between migraines, IBS, and endometriosis was found in a single research.[85]
- ✓ Irritable bowel syndrome and fibromyalgia, two additional chronic pain conditions, are related to interstitial cystitis. The link between these disorders has not been established. [86]

1.6.Management

Fiber, talk therapy, antispasmodic and antidepressant medications, and peppermint oil have all been proved to be helpful therapies.

Diet

FODMAP

The small intestine has a hard time breaking down and absorbing short-chain carbohydrates like FODMAPS. A comprehensive analysis published in 2018 found that while a reduced FODMAP diet has been demonstrated to improve IBS symptoms, the research is of poor quality. [87] The symptoms that are most likely to get better include urgency, gas, bloating, stomach pain, and altered stool output. A national recommendation recommends a low-FODMAPS diet when other dietary and behavioural measures have failed. [87] Dietary restrictions are placed on a number of carbohydrates, such as lactose and fructose, which are both poorly absorbed in the small intestine. Reducing consumption of fructose and fructans has been shown to alleviate symptoms in people with IBS and fructose malabsorption in a dose-dependent manner. [89] The small intestine only partially absorbs a variety of fermentable oligo and polyol carbohydrates, which are subsequently fermented by bacteria in the proximal and distal big digestive tracts. This is a common event that has an impact on everyone. Gas production may result in flatulence and bloating. [90] While FODMAPs may cause some discomfort in certain individuals, they do not promote intestinal inflammation and, in fact, help to avoid it by modifying the gut microbiota in a healthy way. [91-93] FODMAPs do not directly cause irritable bowel syndrome or other functional gastrointestinal disorders; rather, symptoms develop when the intestine's normal response is interfered with. Eliminating all of these items from your diet is the aim of a low-FODMAP diet. Unlike those who have fructose malabsorption, who simply need to limit fructose and fructans, which are also FODMAPs, FODMAPs are restricted as a whole rather than only in small quantities. A low-FODMAP diet may temporarily alleviate digestive symptoms in irritable bowel syndrome patients,[94–96] but its long-term effects may be detrimental due to its detrimental effects on the gut microbiota and metabolome. [97-100] It should only be used for limited periods of time unless a doctor has recommended it. A low-FODMAP diet limits a variety of nutrients, making it challenging to follow for an extended period of time. [116] To pinpoint the precise impacts of this

diet on health, further study is required. If a low-FODMAP diet is followed without confirming the diagnosis of IBS, it is possible that celiac disease will be misdiagnosed. A low-FODMAP diet suppresses or reduces gluten intake, thus any improvement in digestive symptoms may not be attributable to the elimination of FODMAPs but rather to gluten, which is a sign of undiagnosed celiac disease and increases the risk of various major health problems, including cancer. [100-101]

Fiber

It is beneficial to supplement with soluble fiber source like psyllium or psylla husk. This bulking medication helps many IBS-D patients have more regular bowel motions. For individuals suffering from IBS-C, softer, more liquid stools that are simpler to pass could be beneficial. It has not been shown that insoluble fiber assists with IBS. Supplements containing insoluble fiber may exacerbate symptoms for some people. Supplementing with fiber may benefit constipation sufferers. Soluble fiber does not reduce pain, but it does benefit IBS-C sufferers' overall symptoms. Because so many different types and dosages of fiber are employed in the studies, there are many differences about the benefits of dietary fiber. This kind of fiber improved overall symptoms of Irritable Bowel Syndrome however had no effect on pain. In some instances, it was observed that the sulfated fibre reduced symptoms, whilst in other instances, it was discovered that the insoluble fibre increased symptoms. [124] Using 10–30 grammes of ispaghula (psyllium) daily has not been associated with any negative side effects. [125] In terms of dose, one research found that taking 20 g of ispaghula (psyllium) per day was preferable than taking 10 g or 30 g. [102-106]

Fig 05: Psyllium

Medication

Antispasmodics like dicyclomine and antidepressants may be helpful. Pain associated with visceral hypersensitivity in IBS can be reduced by both H1-antihistamines and mast cell stabilizers.

Laxatives

Laxatives that are osmotic, such as polyethylene glycol, sorbitol, and lactulose, can be used to prevent the "cathartic colon" that has been linked to stimulant laxatives.[107] In the treatment of constipation-predominant IBS, Lubiprostone is a gastrointestinal medication that is employed.

Antispasmodics

Antispasmodic drugs (e.g., anticholinergics such as hyoscyamine or dicyclomine) may be helpful for people experiencing cramps or diarrhea. A meta-analysis by the Cochrane Collaboration states that if seven people receive antispasmodic therapy, then at least one person will profit from it. Two categories of antispasmodics are musculotropic and neurotropic. Unlike mebeverine, this family of medications reduces spasms by acting on the smooth muscles of the intestines without affecting normal gut motility. Since the autonomic nervous system is not involved in the action of this medication, typical anticholinergic side effects are absent. An antispasmodic called otilonium might also be useful.

Discontinuation of proton pump inhibitors

An overgrowth of microorganisms in the small intestine (SIBO) can induce the symptoms of Irritable Bowel Syndrome (IBS).IBS symptoms may be alleviated or eliminated by discontinuing PPIs in selected patients, according to a recent study [108]

Antidepressants

Antidepressants may be helpful in the treatment of IBS, however, the evidence is mixed. However, some meta-analyses have revealed an advantage, while others have not. Low dosages of tricyclic antidepressants (TCAs) are beneficial in the treatment of irritable bowel syndrome (IBS). About one-third of those who take TCAs see an improvement. Antidepressants such as selective serotonin reuptake inhibitors (SSRIs) are less effective than other antidepressant types (SSRIs). SSRIs have

been researched in IBS due to their serotonergic effects, particularly in those with constipation as their primary symptom. SSRIs are ineffective as of 2015. [109] In persons with depression, antidepressants are ineffective in treating IBS, presumably because lower dosages of antidepressants than those used to treat depression are necessary for the remission of IBS.

Other agents

Alverine citrate medicines and magnesium-aluminum silicates may be beneficial for individuals with IBS. Rifaximin may be helpful as a treatment for IBS symptoms, such as abdominal bloating and gas, even though relief from stomach distension requires time. When there is an increasing populations of bacteria in the small intestine, it is especially beneficial. For those who have low vitamin levels and suffer from IBS, vitamin D supplementation is advised. Supplementing with vitamin D may help reduce the symptoms of IBS, but further research is required before this treatment option can be recommended. [110-112]

Psychological therapies

Even though trials with poor methodological quality have shown that psychological treatments can be useful in treating IBS, psychological therapies for IBS have shown no notable detrimental effects. A rising number of studies are looking into how the mind and body interact with the digestive system, which has been linked to IBS. Psychological coping mechanisms for dealing with uncomfortable symptoms, as well as tactics for suppressing thoughts and behaviors that exacerbate IBS symptoms, may be found in both hypnosis and cognitive behavioral therapy.[113] NICE clinical guidelines recommend that consideration should be given to psychological treatment strategies such as cognitive behavioral therapy [CBT], hypnotherapy, and/or psychological therapy in treatment-resistant cases where pharmacological therapies have failed to provide relief for at least 12 months.

Reducing stress may reduce the frequency and severity of IBS symptoms. Techniques that may be helpful include:

- Relaxation techniques such as meditation
- Physical activities such as yoga or tai chi
- Regular exercise such as swimming, walking or running

Stimulation of the vagus nerves

The anti-inflammatory properties of vagus nerve stimulation are being investigated for use in the treatment of IBS.

Alternative medicine

A meta-analysis indicated that acupuncture did not affect IBS symptom severity or IBS-related quality of life compared to placebo treatment.

Probiotics

A single dose per day of 10 billion to 100 billion beneficial bacteria is recommended for the successful treatment of IBS. Further research is needed on particular strains of beneficial bacteria in order to make more specific recommendations. Probiotics also provide a wide range of therapeutic benefits, including strengthening the intestinal mucosal barrier, producing bacteriocins, reducing intestinal permeability and bacterial translocation, and locally and systemically modifying the immune system. Probiotics may also have a positive effect on the brain-gut axis because they mitigate the damaging effects of stress on the immunological and digestive systems of the gut. Probiotics like Bifidobacteria infantis and Lactobacillus plantarum have been shown to be beneficial; however, just one review found that Bifidobacteria infantis was effective.

.[114] A reduction in proinflammatory cytokine activity and an increase in blood tryptophan levels may relieve symptoms of depression in those using B. infantis.

Yogurt that is fortified with probiotics, which may alleviate the symptoms of IBS, is available. Irritable bowel syndrome may be helped by a strain of probiotic yeast called Saccharomyces boulardii. Different strains of probiotics have varying impacts on IBS symptoms. These include Bifidobacterium longum, Bifidobacterium breve, and Lactobacillus acidophilus. L. casei, B. breve, and/or B. infantis were effective in reducing symptoms of abdominal distension. In addition to B. breve, B. infantis, B. longum and L. acidophilus, L. bulgaricus, and Streptococcus salivarius ssp. thermophilus, all of these organisms have been proven to influence flatulence. Despite a few positive findings, the majority of clinical research demonstrates that probiotics do not reduce symptoms such as straining, incomplete evacuation, loose stool, fecal urgency, or frequent bowel

movements. Probiotics may or may not increase the general quality of life, however, the research is inconclusive. Probiotics may alleviate IBS symptoms by conserving the gut microbiota, normalizing cytokine blood levels, improving intestinal transit time,reducing small intestine permeability, and treating small intestinal bacterial overgrowth of fermenting bacteria in the small intestine. As of 2019, it does not appear that a fecal transplant is beneficial.

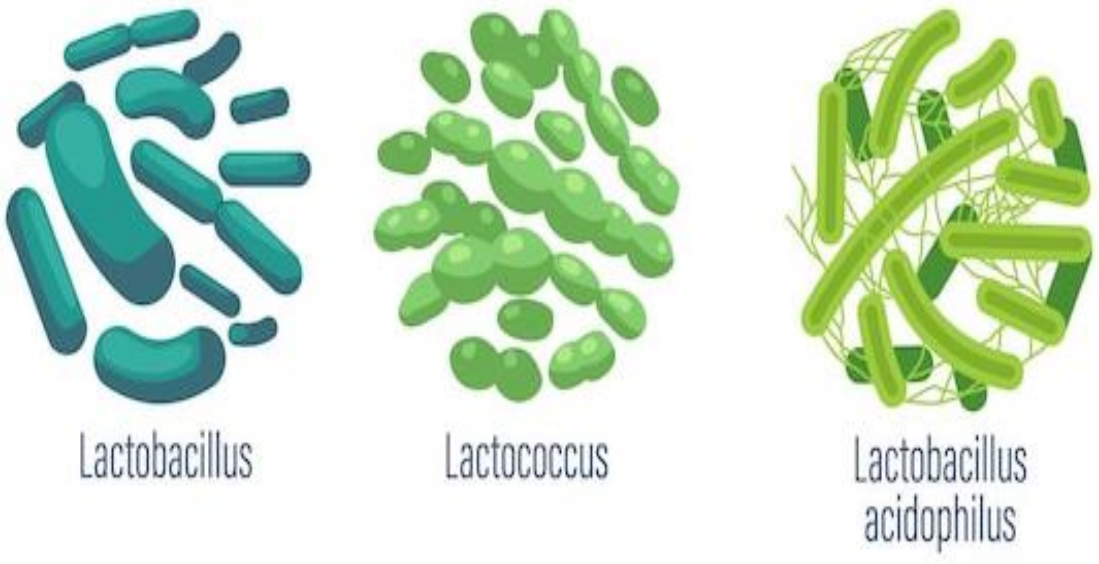

Fig 06: Lactobacillus acidophilus

Herbal remedies

Fig 07: Peppermint leaf

It seems that peppermint oil is advantageous. A meta-analysis showed that it was at the very least better than a placebo in the short term for treating IBS symptoms. Due to the small sample size and unclear definition of blinding for treatment recipients, a previous meta-analysis concluded that the results of the peppermint oil study were inconclusive. [116] Pregnant women are cautioned from chewing or breaking the enteric coating since doing so might cause stomach reflux, which can result in significant difficulties. Occasionally occurring but possible side effects include nausea and peritoneal burning. Iberogast, a multi-herbal extract, was shown to be more effective than a placebo. A rigorous meta-analysis of twelve independent research concluded that peppermint oil is a potent therapy for people with irritable bowel syndrome. There hasn't been much study on cannabinoids as a treatment for IBS. Cannabis is a feasible treatment option for IBS since the GI tract's motility, secretion, and inflammation are controlled by the ECS (Endocannabinoid system). [116] There have only been a few studies to support the effectiveness of other herbal treatments for IBS. When using any plant, it's a good idea to be aware of possible medication interactions and side effects.

The goal of my studies

The goal of my studies:

A common illness, irritable bowel syndrome (IBS) affects the large intestine. Signs and symptoms include cramping, stomach pain, bloating, gas, diarrhea or constipation, or both. You will have to live with IBS for a very long time.

My aim of this study is,

a) To learn the cause of IBS.
b) To understand the percentage of IBS sufferers.
c) To see IBS Current Treatments.
d) To understand IBS patients' faces consistency and bowel symptoms.
e) To know IBS patients, habituate or sensitize to recurrent rectal maximum distensions
f) Launch a new higher education aria.

Methodology

Methodology

3.1. Introduction:

The examination is led by a literature review. Around 51 papers are reviewed for this study.

3.2. Research Design:

This exploration was planned through google scholar and many other websites to find out literature.

3.3. Method of Data Analysis:

After an assortment of information, all information was checked for precision and internal consistency to deny missing or clashing data and those were discarded. Information investigation was done through Microsoft dominate refreshed rendition. All collected information is between 1970-and 2022.

3.4. Ethical Considerations

Verbal educated assent was taken from the investigation members before beginning the information assortment. The obscurity of the respondents was kept private and study subjects were educated that they can have the option to leave the program at any phase of the information assortment. The investigation was supported by the Department of Pharmacy.

Result

4.1.Gender

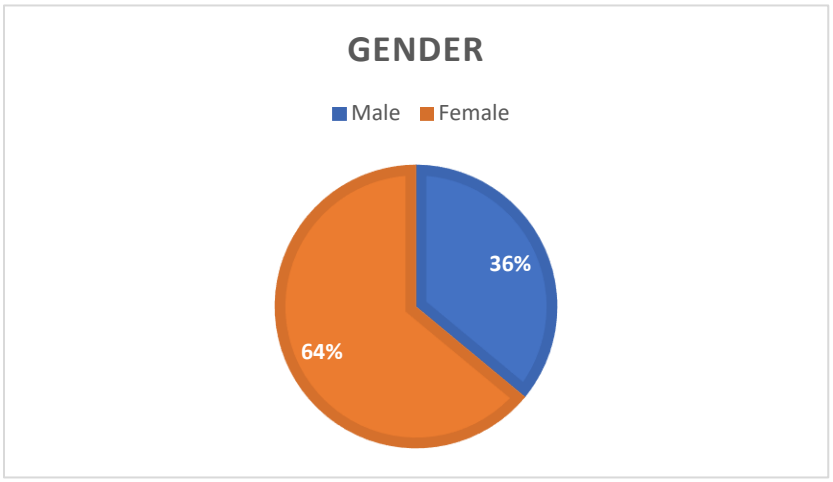

Fig 08: Gender

The review's underlying data shows that 64% of females have IBS. IBS affects 36% of males. IBS affects more women than men. [117]

4.2. Cause of IBS

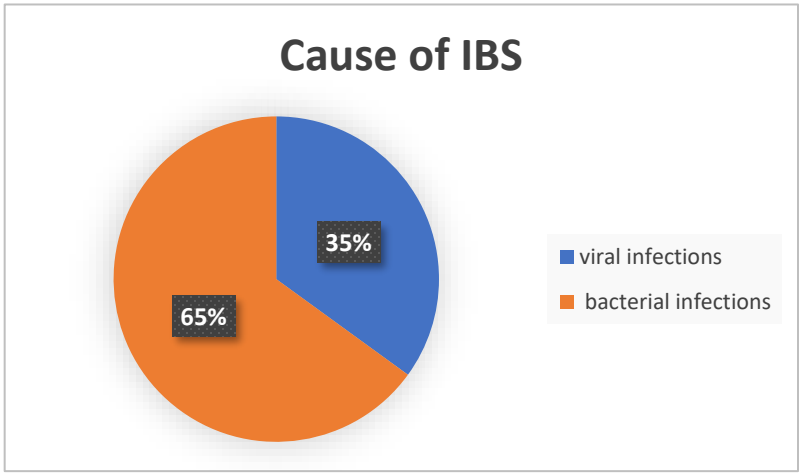

Fig 09: Cause of IBS

In this study, the underlying data show that around 35% of IBS cases were brought on by viral illnesses, namely norovirus and rotavirus, and that approximately 65% of cases were brought on by Campylobacter spp. and Salmonella spp. infections.[118]

4.3. Symptoms of IBS

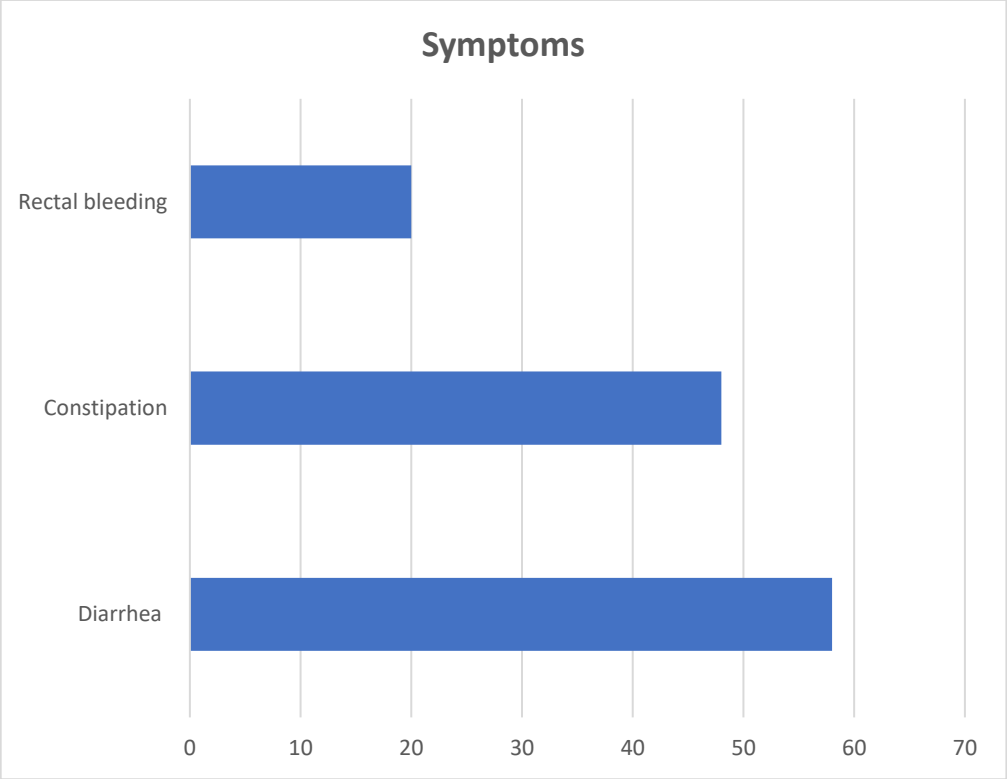

Fig 10: Symptoms of IBS

Although diarrhea and constipation were reported by 12 and 13 percent of those without IBS symptoms, respectively, it should come as no surprise that 58% of those with IBS had diarrhea and 48% had constipation. According to this study, 20% of the patients had rectal bleeding. [119]

4.4. Types of IBS

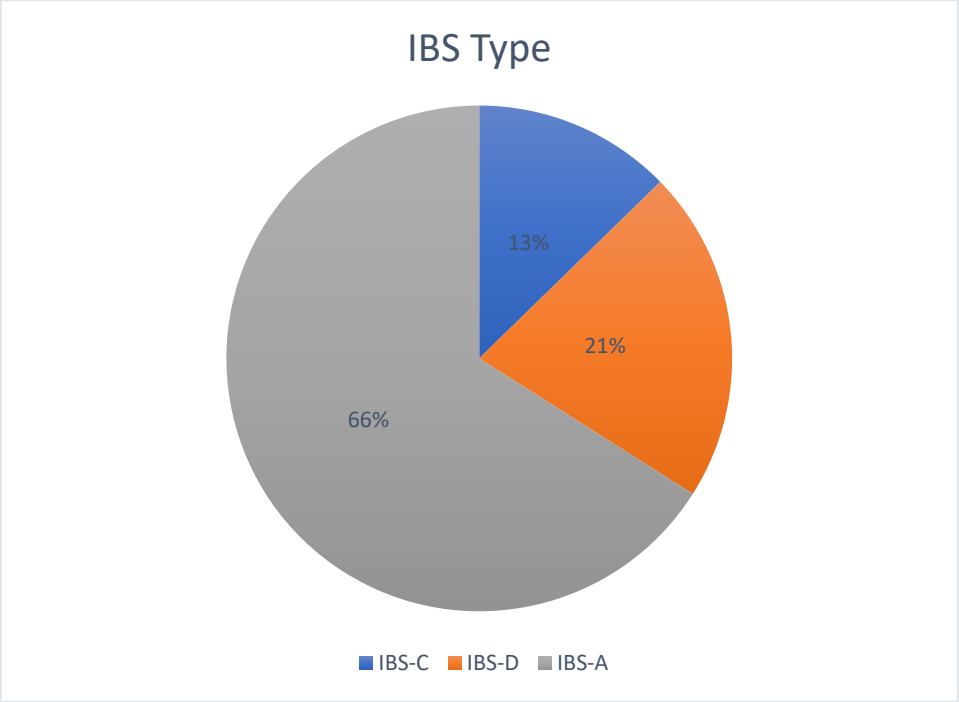

Fig 11: Type of IBS

I found out through this review that 66 percent of people have IBS-A. IBS-D patients make up 21% of the population, compared to IBS-C patients who make up 13% of the total. The results revealed that 4 percent of people with IBS who had received a medical diagnosis also had IBS-C, as opposed to 21 percent of those with IBS-D. The percentages for those who had not received a medical diagnosis were 15% and 21%, respectively. [120]

4.5. Treatment:

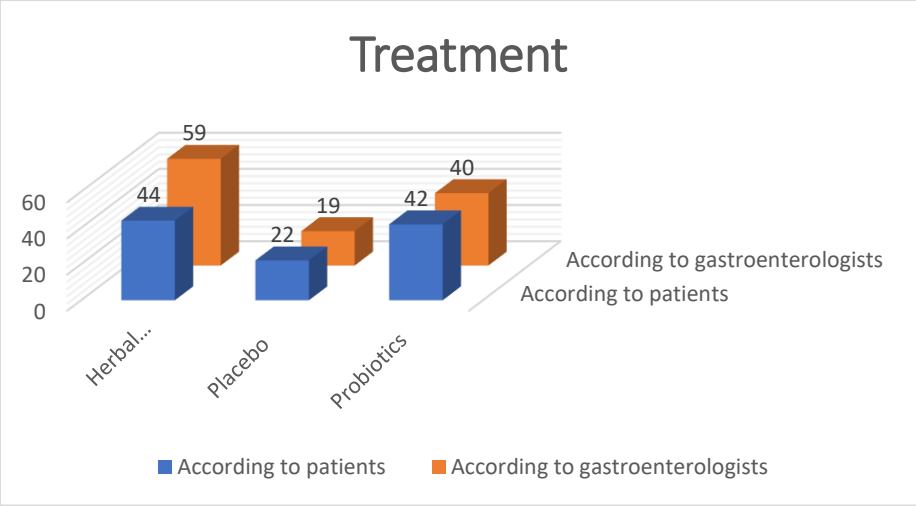

Fig 12: Treatment

Irritable bowel syndrome (IBS), a chronic illness that affects 3 to 25% of the general population, is characterized by stomach discomfort, constipation, and diarrhea. The goal of therapy is to reduce symptoms since there is no cure, however this goal is often only partially achieved. Patients in the conventional herbal formulations group improved by 44% (according to patients) and 59% (according to gastroenterologists) compared to patients in the placebo group, who improved by just 22% (according to patients) and 19% (according to gastroenterologists). According to patients and researchers alike, the outcomes of patients who got personalized CHM increased by 40% and 42%, respectively. [121]

Conclusion

Conclusion

Irritable bowel syndrome, often known as IBS, is a challenging ailment, the underlying mechanism of which is not yet fully understood by researchers who work in the medical industry. The disorder is most often known as irritable bowel syndrome (IBS). Irritable bowel syndrome is a prevalent ailment, and its abbreviation, IBS, is frequently used interchangeably. A therapeutic strategy that is universally applicable to the vast majority of people is not an option that should be considered because of the wide variety of potential symptoms, which may include anything from constipation to diarrhea, as well as the many different ways in which the issue could manifest itself. As a result of this wide variety of potential symptoms, as well as the many different ways in which the issue could manifest itself, it is not recommended that this strategy be considered. This is due to the fact that there is a broad spectrum of possible symptoms. Because of the factors discussed above, it would be immoral to even consider the possibility of doing so. This is as a result of the fact that the sickness may manifest itself in a number of various ways, each of which may be very distinct from the others, and this is the reason why this is the case.

Reference

Reference:

1. "Definition and Facts for Irritable Bowel Syndrome". NIDDKD. February 23, 2015. Archived from the original on April 2, 2016. Retrieved March 29, 2016.
2. "Symptoms and Causes of Irritable Bowel Syndrome". NIDDK. February 23, 2015. Archived from the original on April 5, 2016. Retrieved March 29, 2016.
3. Chey WD, Kurlander J, Eswaran S (March 2015). "Irritable bowel syndrome: a clinical review". JAMA. 313 (9): 949–58. doi:10.1001/jama.2015.0954. PMID 25734736. S2CID 205062386.
4. Levy J, Bernstein L, Silber N (December 2014). "Celiac disease: an immune dysregulation syndrome". Current Problems in Pediatric and Adolescent Health Care. 44 (11): 324–7. doi:10.1016/j.cppeds.2014.10.002. PMID 25499458.
5. "Treatment for Irritable Bowel Syndrome". NIDDK. February 23, 2015. Archived from the original on April 6, 2016. Retrieved March 29, 2016.
6. Quigley EM (2013). "Treatment level 1". Irritable Bowel Syndrome: Diagnosis and Clinical Management (First ed.). Chichester, West Sussex: Wiley-Blackwell. ISBN 9781118444740. Archived from the original on September 8, 2017.
7. Maxion-Bergemann S, Thielecke F, Abel F, Bergemann R (2006). "Costs of irritable bowel syndrome in the UK and US". PharmacoEconomics. 24 (1): 21–37. doi:10.2165/00019053-200624010-00002. PMID 16445300. S2CID 45376327.
8. Lovell RM, Ford AC (July 2012). "Global prevalence of and risk factors for irritable bowel syndrome: a meta-analysis". Clinical Gastroenterology and Hepatology. 10 (7): 712–721.e4. doi:10.1016/j.cgh.2012.02.029. PMID 22426087. Pooled prevalence in all studies was 11.2% (95% CI, 9.8%-12.8%). The prevalence varied according to country (from 1.1% to 45.0%) and criteria used to define IBS... Women are at slightly higher risk for IBS than men.
9. Hatch MC (2000). Women and Health. San Diego, Calif: Academic Press. p. 1098. ISBN 9780122881459. Archived from the original on September 8, 2017.
10. DuPont AW (February 2008). "Postinfectious irritable bowel syndrome". Clinical Infectious Diseases. Oxford University Press. 46 (4): 594–599. doi:10.1086/526774. PMID 18205536.
11. Spiller R, Lam C (July 2012). "An Update on Post-infectious Irritable Bowel Syndrome: Role of Genetics, Immune Activation, Serotonin, and Altered Microbiome". Journal of

Neurogastroenterology and Motility. 18 (3): 258–268. doi:10.5056/jnm.2012.18.3.258. PMC 3400813. PMID 22837873.

12. Spiller RC (May 2003). "Postinfectious irritable bowel syndrome". Gastroenterology. 124 (6): 1662–1671. doi:10.1016/S0016-5085(03)00324-X. PMID 12761724.
13. Iacob T, Ţăţulescu DF, Dumitraşcu DL (2017). "Therapy of the postinfectious irritable bowel syndrome: an update". Cluj Medical. 90 (2): 133–138. doi:10.15386/cjmed-752. PMC 5433563. PMID 28559695.
14. Schmulson MW, Chang L (November 1999). "Diagnostic approach to the patient with irritable bowel syndrome". The American Journal of Medicine. 107 (5A): 20S–26S. doi:10.1016/S0002-9343(99)00278-8. PMID 10588169.
15. Tamparo C (2011). Fifth Edition: Diseases of the Human Body. Philadelphia, PA: F.A. Davis Company. p. 407. ISBN 978-0-8036-2505-1.
16. Talley NJ (November 2006). "Irritable bowel syndrome". Internal Medicine Journal. 36 (11): 724–8. doi:10.1111/j.1445-5994.2006.01217.x. PMC 1761148. PMID 17040359.
17. Sperber AD, Dekel R (April 2010). "Irritable Bowel Syndrome and Co-morbid Gastrointestinal and Extra-gastrointestinal Functional Syndromes". Journal of Neurogastroenterology and Motility. 16 (2): 113–9. doi:10.5056/jnm.2010.16.2.113. PMC 2879857. PMID 20535341.
18. Wouters MM, Vicario M, Santos J (January 2016). "The role of mast cells in functional GI disorders". Gut. 65 (1): 155–68. doi:10.1136/gutjnl-2015-309151. PMID 26194403. S2CID 3456082.
19. Ohman L, Simrén M (March 2010). "Pathogenesis of IBS: role of inflammation, immunity and neuroimmune interactions". Nature Reviews. Gastroenterology & Hepatology. 7 (3): 163–173. doi:10.1038/nrgastro.2010.4. PMID 20101257. S2CID 20898797.
20. Rothenberg ME (June 2021). "An Allergic Basis for Abdominal Pain". The New England Journal of Medicine. 384 (22): 2156–2158. doi:10.1056/NEJMcibr2104146. PMID 34077648. S2CID 235322218.
21. Enck P, Aziz Q, Barbara G, Farmer AD, Fukudo S, Mayer EA, et al. (March 2016). "Irritable bowel syndrome". Nature Reviews. Disease Primers. 2: 16014. doi:10.1038/nrdp.2016.14. PMC 5001845. PMID 27159638.

22. Enck P, Aziz Q, Barbara G, Farmer AD, Fukudo S, Mayer EA, et al. (March 2016). "Irritable bowel syndrome". Nature Reviews. Disease Primers. 2: 16014. doi:10.1038/nrdp.2016.14. PMC 5001845. PMID 27159638.
23. Thabane M, Kottachchi DT, Marshall JK (August 2007). "Systematic review and meta-analysis: The incidence and prognosis of post-infectious irritable bowel syndrome". Alimentary Pharmacology & Therapeutics. 26 (4): 535–544. doi:10.1111/j.1365-2036.2007.03399.x. PMID 17661757. S2CID 41136248. Archived from the original on July 13, 2013.
24. "World Gastroenterology Organisation Global Guidelines. Irritable Bowel Syndrome: a Global Perspective" (PDF). World Gastroenterology Organisation. September 2015. Archived (PDF) from the original on May 27, 2016. Retrieved April 24, 2016.
25. Shanahan F, Quigley EM (May 2014). "Manipulation of the microbiota for treatment of IBS and IBD-challenges and controversies". Gastroenterology. 146 (6): 1554–1563. doi:10.1053/j.gastro.2014.01.050. PMID 24486051.
26. Beatty JK, Bhargava A, Buret AG (April 2014). "Post-infectious irritable bowel syndrome: mechanistic insights into chronic disturbances following enteric infection". World Journal of Gastroenterology. 20 (14): 3976–85. doi:10.3748/wjg.v20.i14.3976. PMC 3983453. PMID 24744587.
27. Fukudo S, Nomura T, Muranaka M, Taguchi F (September 1993). "Brain-gut response to stress and cholinergic stimulation in irritable bowel syndrome. A preliminary study". Journal of Clinical Gastroenterology. 17 (2): 133–41. doi:10.1097/00004836-199309000-00009. PMID 8031340.
28. Barreau F, Ferrier L, Fioramonti J, Bueno L (September 2007). "New insights in the etiology and pathophysiology of irritable bowel syndrome: contribution of neonatal stress models". Pediatric Research. 62 (3): 240–5. doi:10.1203/PDR.0b013e3180db2949. PMID 17622962. S2CID 26538682.
29. Li J, Zhu W, Liu W, Wu Y, Wu B (January 2016). "Rifaximin for Irritable Bowel Syndrome: A Meta-Analysis of Randomized Placebo-Controlled Trials". Medicine. 95 (4): e2534. doi:10.1097/MD.0000000000002534. PMC 5291563. PMID 26825893.
30. Spiller R, Aziz Q, Creed F, Emmanuel A, Houghton L, Hungin P, Jones R, Kumar D, Rubin G, Trudgill N, Whorwell P (December 2007). "Guidelines on the irritable bowel syndrome:

mechanisms and practical management". Gut. 56 (12): 1770–98. doi:10.1136/gut.2007.119446. PMC 2095723. PMID 17488783.

31. Fukudo S (January 2007). "Role of corticotropin-releasing hormone in irritable bowel syndrome and intestinal inflammation". Journal of Gastroenterology. 42 (Suppl 17): 48–51. doi:10.1007/s00535-006-1942-7. PMID 17238026. S2CID 26067985.
32. "Post-infectious IBS". aboutibs.org. Retrieved April 2, 2021.
33. Barbara G, Grover M, Bercik P, Corsetti M, Ghoshal UC, Ohman L, Rajilić-Stojanović M (January 2019). "Rome Foundation Working Team Report on Post-Infection Irritable Bowel Syndrome". Gastroenterology. 156 (1): 46–58.e7. doi:10.1053/j.gastro.2018.07.011. PMC 6309514. PMID 30009817.
34. Ghoshal UC, Gwee KA (July 2017). "Post-infectious IBS, tropical sprue and small intestinal bacterial overgrowth: the missing link". Nature Reviews. Gastroenterology & Hepatology. 14 (7): 435–441. doi:10.1038/nrgastro.2017.37. PMID 28513629. S2CID 33660302.
35. Chen B, Kim JJ, Zhang Y, Du L, Dai N (July 2018). "Prevalence and predictors of small intestinal bacterial overgrowth in irritable bowel syndrome: a systematic review and meta-analysis". Journal of Gastroenterology. 53 (7): 807–818. doi:10.1007/s00535-018-1476-9. PMID 29761234. S2CID 46889298.
36. Ghoshal UC, Srivastava D (March 2014). "Irritable bowel syndrome and small intestinal bacterial overgrowth: Meaningful association or unnecessary hype". World Journal of Gastroenterology. 20 (10): 2482–91. doi:10.3748/wjg.v20.i10.2482. PMC 3949258. PMID 24627585.
37. Bennet SM, Ohman L, Simren M (May 2015). "Gut microbiota as potential orchestrators of irritable bowel syndrome". Gut and Liver. 9 (3): 318–31. doi:10.5009/gnl14344. PMC 4413965. PMID 25918261.
38. Collins SM (August 2014). "A role for the gut microbiota in IBS". Nature Reviews. Gastroenterology & Hepatology. 11 (8): 497–505. doi:10.1038/nrgastro.2014.40. PMID 24751910. S2CID 10676400.
39. Santelmann H, Howard JM (January 2005). "Yeast metabolic products, yeast antigens, and yeasts as possible triggers for irritable bowel syndrome". European Journal of Gastroenterology & Hepatology. 17 (1): 21–6. CiteSeerX 10.1.1.567.6030. doi:10.1097/00042737-200501000-00005. PMID 15647635. S2CID 35882838.

40. Lagacé-Wiens PR, VanCaeseele PG, Koschik C (August 2006). "Dientamoeba fragilis an emerging role in intestinal disease". CMA. 175 (5): 468–9. doi:10.1503/cmaj.060265. PMC 1550747. PMID 16940260.
41. Amin OM (June 2002). "Seasonal prevalence of intestinal parasites in the United States during 2000". The American Journal of Tropical Medicine and Hygiene. 66 (6): 799–803. doi:10.4269/ajtmh.2002.66.799. PMID 12224595.
42. Stark D, van Hal S, Marriott D, Ellis J, Harkness J (January 2007). "Irritable bowel syndrome: a review on the role of intestinal protozoa and the importance of their detection and diagnosis". International Journal for Parasitology. 37 (1): 11–20. doi:10.1016/j.ijpara.2006.09.009. PMID 17070814.
43. Wawrzyniak I, Poirier P, Viscogliosi E, Dionigia M, Texier C, Delbac F, Alaoui HE (October 2013). "Blastocystis, an unrecognized parasite: an overview of pathogenesis and diagnosis". Therapeutic Advances in Infectious Disease. 1 (5): 167–78. doi:10.1177/2049936113504754. PMC 4040727. PMID 25165551. Recent in vitro and in vivo studies have shed new light on the pathogenic power of this parasite, suggesting that Blastocystis sp. infection is associated with a variety of gastrointestinal disorders, and may play a significant role in irritable bowel syndrome, and may be linked with cutaneous lesions (urticaria).
44. Roberts T, Stark D, Harkness J, Ellis J (2014). "Update on the pathogenic potential and treatment options for Blastocystis sp". Gut Pathogens. 6: 17. doi:10.1186/1757-4749-6-17. PMC 4039988. PMID 24883113.
45. Rostami A, Riahi SM, Haghighi A, Saber V, Armon B, Seyyedtabaei SJ (September 2017). "The role of Blastocystis sp. and Dientamoeba fragilis in irritable bowel syndrome: a systematic review and meta-analysis". Parasitology Research. 116 (9): 2361–2371. doi:10.1007/s00436-017-5535-6. PMID 28668983. S2CID 32999514.
46. Windsor JJ, Macfarlane L (May 2005). "Irritable bowel syndrome: the need to exclude Dientamoeba fragilis". The American Journal of Tropical Medicine and Hygiene. 72 (5): 501, author reply 501–2. doi:10.4269/ajtmh.2005.72.5.0720501. PMID 15891119. Archived from the original on July 17, 2010.
47. Williams CE, Williams EA, Corfe BM (October 2018). "Vitamin D status in irritable bowel syndrome and the impact of supplementation on symptoms: what do we know and what do we

need to know?" (PDF). European Journal of Clinical Nutrition. 72 (10): 1358–1363. doi:10.1038/s41430-017-0064-z. PMID 29367731. S2CID 19291568.

48. Ferguson LR, Laing B, Marlow G, Bishop K (January 2016). "The role of vitamin D in reducing gastrointestinal disease risk and assessment of individual dietary intake needs: Focus on genetic and genomic technologies". Molecular Nutrition & Food Research. 60 (1): 119–33. doi:10.1002/mnfr.201500243. PMID 26251177.
49. Barbalho SM, Goulart RA, Araújo AC, Guiguer ÉL, Bechara MD (April 2019). "Irritable bowel syndrome: a review of the general aspects and the potential role of vitamin D". Expert Rev Gastroenterol Hepatol. 13 (4): 345–359. doi:10.1080/17474124.2019.1570137. PMID 30791775. S2CID 73484679.
50. Beyder A, Farrugia G (2016). "Ion channelopathies in functional GI disorders". American Journal of Physiology. Gastrointestinal and Liver Physiology. 311 (4): G581–G586. doi:10.1152/ajpgi.00237.2016. PMC 5142191. PMID 27514480.
51. Verstraelen TE, Ter Bekke RM, Volders PG, Masclee AA, Kruimel JW (2015). "The role of the SCN5A-encoded channelopathy in irritable bowel syndrome and other gastrointestinal disorders". Neurogastroenterology & Motility. 27 (7): 906–13. doi:10.1111/nmo.12569. PMID 25898860. S2CID 5055360.
52. Yawn BP, Lydick E, Locke GR, Wollan PC, Bertram SL, Kurland MJ (2001). "Do published guidelines for evaluation of irritable bowel syndrome reflect practice?". BMC Gastroenterology. 1: 11. doi:10.1186/1471-230X-1-11. PMC 59674. PMID 11701092.
53. Irvine AJ, Chey WD, Ford AC (January 2017). "Screening for Celiac Disease in Irritable Bowel Syndrome: An Updated Systematic Review and Meta-analysis" (PDF). The American Journal of Gastroenterology (Review). 112 (1): 65–76. doi:10.1038/ajg.2016.466. PMID 27753436. S2CID 269053. Although IBS is not a diagnosis of exclusion, with physicians advised to minimize the use of investigations, the gastrointestinal (GI) tract has a limited repertoire of symptoms, meaning that abdominal pain and a change in bowel habits are not specific to the disorder.
54. Drossman DA (February 2016). "Functional Gastrointestinal Disorders: History, Pathophysiology, Clinical Features, and Rome IV". Gastroenterology. 150 (6): 1262–1279.e2. doi:10.1053/j.gastro.2016.02.032. PMID 27144617. S2CID 6441439.

55. Saha L (June 2014). "Irritable bowel syndrome: pathogenesis, diagnosis, treatment, and evidence-based medicine". World Journal of Gastroenterology (Review). 20 (22): 6759–73. doi:10.3748/wjg.v20.i22.6759. PMC 4051916. PMID 24944467.
56. Fass R, Longstreth GF, Pimentel M, Fullerton S, Russak SM, Chiou CF, Reyes E, Crane P, Eisen G, McCarberg B, Ofman J (September 2001). "Evidence- and consensus-based practice guidelines for the diagnosis of irritable bowel syndrome". Archives of Internal Medicine. 161 (17): 2081–8. doi:10.1001/archinte.161.17.2081. PMID 11570936.
57. Talley NJ (2006). "A unifying hypothesis for the functional gastrointestinal disorders: multiple diseases or one irritable gut?". Reviews in Gastroenterological Disorders. 6 (2): 72–8. PMID 16699476.
58. Hauser C (2005). Mayo Clinic Gastroenterology and Hepatology Board Review. CRC Press. p. 225–. ISBN 978-0-203-50274-7. Archived from the original on May 10, 2013. Retrieved October 24, 2010.
59. El-Salhy M (October 2012). "Irritable bowel syndrome: diagnosis and pathogenesis". World Journal of Gastroenterology. 18 (37): 5151–63. doi:10.3748/wjg.v18.i37.5151. PMC 3468846. PMID 23066308.
60. Fasano A, Sapone A, Zevallos V, Schuppan D (May 2015). "Nonceliac gluten sensitivity". Gastroenterology (Review). 148 (6): 1195–204. doi:10.1053/j.gastro.2014.12.049. PMID 25583468.
61. Volta U, Caio G, De Giorgio R, Henriksen C, Skodje G, Lundin KE (June 2015). "Non-celiac gluten sensitivity: a work-in-progress entity in the spectrum of wheat-related disorders". Best Practice & Research. Clinical Gastroenterology. 29 (3): 477–91. doi:10.1016/j.bpg.2015.04.006. PMID 26060112.
62. Rossi A, Di Lollo AC, Guzzo MP, Giacomelli C, Atzeni F, Bazzichi L, Di Franco M (2015). "Fibromyalgia and nutrition: what news?". Clinical and Experimental Rheumatology. 33 (1 Suppl 88): S117-25. PMID 25786053.
63. San Mauro Martín I, Garicano Vilar E, Collado Yurrutia L, Ciudad Cabañas MJ (December 2014). "[Is gluten the great etiopathogenic agent of disease in the XXI century?]". Nutricion Hospitalaria. 30 (6): 1203–10. doi:10.3305/nh.2014.30.6.7866. PMID 25433099.
64. Catassi C, Bai JC, Bonaz B, Bouma G, Calabrò A, Carroccio A, Castillejo G, Ciacci C, Cristofori F, Dolinsek J, Francavilla R, Elli L, Green P, Holtmeier W, Koehler P, Koletzko S,

Meinhold C, Sanders D, Schumann M, Schuppan D, Ullrich R, Vécsei A, Volta U, Zevallos V, Sapone A, Fasano A (September 2013). "Non-Celiac Gluten sensitivity: the new frontier of gluten related disorders". Nutrients (Review). 5 (10): 3839–53. doi:10.3390/nu5103839. PMC 3820047. PMID 24077239.

65. Lebwohl B, Ludvigsson JF, Green PH (October 2015). "Celiac disease and non-celiac gluten sensitivity". BMJ (Review). 351: h4347. doi:10.1136/BMJ.h4347. PMC 4596973. PMID 26438584.
66. Bixquert Jiménez M (August 2009). "Treatment of irritable bowel syndrome with probiotics. An etiopathogenic approach at last?". Revista Española de Enfermedades Digestivas. 101 (8): 553–64. doi:10.4321/s1130-01082009000800006. PMID 19785495.
67. Spiegel BM, DeRosa VP, Gralnek IM, Wang V, Dulai GS (June 2004). "Testing for celiac sprue in irritable bowel syndrome with predominant diarrhea: a cost-effectiveness analysis". Gastroenterology. 126 (7): 1721–32. doi:10.1053/j.gastro.2004.03.012. PMID 15188167.
68. Su YC, Wang WM, Wang SY, Lu SN, Chen LT, Wu DC, Chen CY, Jan CM, Horowitz M (August 2000). "The association between Helicobacter pylori infection and functional dyspepsia in patients with irritable bowel syndrome". The American Journal of Gastroenterology. 95 (8): 1900–5. PMID 10950033.
69. Gerards C, Leodolter A, Glasbrenner B, Malfertheiner P (2001). "H. pylori infection and visceral hypersensitivity in patients with irritable bowel syndrome". Digestive Diseases. 19 (2): 170–3. doi:10.1159/000050673. PMID 11549828. S2CID 6877270.
70. Grazioli B, Matera G, Laratta C, Schipani G, Guarnieri G, Spiniello E, Imeneo M, Amorosi A, Focà A, Luzza F (March 2006). "Giardia lamblia infection in patients with irritable bowel syndrome and dyspepsia: a prospective study". World Journal of Gastroenterology. 12 (12): 1941–4. doi:10.3748/wjg.v12.i12.1941. PMC 4087522. PMID 16610003. Archived from the original on August 15, 2009.
71. Vernia P, Ricciardi MR, Frandina C, Bilotta T, Frieri G (April 1995). "Lactose malabsorption and irritable bowel syndrome. Effect of a long-term lactose-free diet". The Italian Journal of Gastroenterology. 27 (3): 117–21. PMID 7548919.
72. Brandt LJ, Chey WD, Foxx-Orenstein AE, Schiller LR, Schoenfeld PS, Spiegel BM, Talley NJ, Quigley EM (January 2009). "An evidence-based position statement on the management of irritable bowel syndrome" (PDF). The American Journal of Gastroenterology. 104 (Suppl

1): S1-35. doi:10.1038/ajg.2008.122. PMID 19521341. S2CID 12556370. Archived (PDF) from the original on December 5, 2010.

73. Wedlake L, A'Hern R, Russell D, Thomas K, Walters JR, Andreyev HJ (October 2009). "Systematic review: the prevalence of idiopathic bile acid malabsorption as diagnosed by SeHCAT scanning in patients with diarrhea-predominant irritable bowel syndrome". Alimentary Pharmacology & Therapeutics. 30 (7): 707–17. doi:10.1111/j.1365-2036.2009.04081.x. PMID 19570102. S2CID 11327665.
74. Cole JA, Rothman KJ, Cabral HJ, Zhang Y, Farraye FA (September 2006). "Migraine, fibromyalgia, and depression among people with IBS: a prevalence study". BMC Gastroenterology. 6: 26. doi:10.1186/1471-230X-6-26. PMC 1592499. PMID 17007634.
75. Beyder A, Farrugia G (October 2016). "Ion channelopathies in functional GI disorders". Am J Physiol Gastrointest Liver Physiol. 311 (4): G581–G586. doi:10.1152/ajpgi.00237.2016. PMC 5142191. PMID 27514480.
76. Bellini M, Biagi S, Stasi C, Costa F, Mumolo MG, Ricchiuti A, Marchi S (March 2006). "Gastrointestinal manifestations in myotonic muscular dystrophy". World J Gastroenterol. 12 (12): 1821–1828. doi:10.3748/wjg.v12.i12.1821. PMC 4087506. PMID 16609987.
77. Bercik P, Verdu EF, Collins SM (June 2005). "Is irritable bowel syndrome a low-grade inflammatory bowel disease?". Gastroenterology Clinics of North America. 34 (2): 235–45, vi-vii. doi:10.1016/j.gtc.2005.02.007. PMID 15862932.
78. Quigley EM (2005). "Irritable bowel syndrome and inflammatory bowel disease: interrelated diseases?". Chinese Journal of Digestive Diseases. 6 (3): 122–32. doi:10.1111/j.1443-9573.2005.00202.x. PMID 16045602.
79. Simrén M, Axelsson J, Gillberg R, Abrahamsson H, Svedlund J, Björnsson ES (February 2002). "Quality of life in inflammatory bowel disease in remission: the impact of IBS-like symptoms and associated psychological factors". The American Journal of Gastroenterology. 97 (2): 389–96. doi:10.1016/S0002-9270(01)04037-0. PMID 11866278.
80. Minderhoud IM, Oldenburg B, Wismeijer JA, van Berge Henegouwen GP, Smout AJ (March 2004). "IBS-like symptoms in patients with inflammatory bowel disease in remission; relationships with quality of life and coping behavior". Digestive Diseases and Sciences. 49 (3): 469–74. doi:10.1023/B:DDAS.0000020506.84248.f9. PMID 15139501. S2CID 7853070.

81. García Rodríguez LA, Ruigómez A, Wallander MA, Johansson S, Olbe L (March 2000). "Detection of colorectal tumor and inflammatory bowel disease during follow-up of patients with an initial diagnosis of irritable bowel syndrome". Scandinavian Journal of Gastroenterology. 35 (3): 306–11. doi:10.1080/003655200750024191. PMID 10766326.
82. Corazziari E, Attili AF, Angeletti C, De Santis A (December 2008). "Gallstones, cholecystectomy and irritable bowel syndrome (IBS) MICOL population-based study". Digestive and Liver Disease. 40 (12): 944–50. doi:10.1016/j.dld.2008.02.013. PMID 18406218.
83. Cole JA, Yeaw JM, Cutone JA, Kuo B, Huang Z, Earnest DL, Walker AM (December 2005). "The incidence of abdominal and pelvic surgery among patients with irritable bowel syndrome". Digestive Diseases and Sciences. 50 (12): 2268–75. doi:10.1007/s10620-005-3047-1. PMID 16416174. S2CID 687380.
84. Longstreth GF, Yao JF (June 2004). "Irritable bowel syndrome and surgery: a multivariable analysis". Gastroenterology. 126 (7): 1665–73. doi:10.1053/j.gastro.2004.02.020. PMID 15188159.
85. Tietjen GE, Bushnell CD, Herial NA, Utley C, White L, Hafeez F (2007). "Endometriosis is associated with the prevalence of comorbid conditions in migraine". Headache. 47 (7): 1069–78. doi:10.1111/j.1526-4610.2007.00784.x. PMID 17635599. S2CID 34972425.
86. "Interstitial cystitis: Risk factors". Mayo Clinic. January 20, 2009. Archived from the original on May 16, 2008.
87. Dionne J, Ford AC, Yuan Y, Chey WD, Lacy BE, Saito YA, Quigley EM, Moayyedi P (September 2018). "A Systematic Review and Meta-Analysis Evaluating the Efficacy of a Gluten-Free Diet and a Low FODMAPs Diet in Treating Symptoms of Irritable Bowel Syndrome". The American Journal of Gastroenterology. 113 (9): 1290–1300. doi:10.1038/s41395-018-0195-4. PMID 30046155. S2CID 50786768.
88. Staudacher HM, Irving PM, Lomer MC, Whelan K (April 2014). "Mechanisms and efficacy of dietary FODMAP restriction in IBS". Nature Reviews. Gastroenterology & Hepatology (Review). 11 (4): 256–66. doi:10.1038/nrgastro.2013.259. PMID 24445613. S2CID 23001679. An emerging body of research now demonstrates the efficacy of fermentable carbohydrate restriction in IBS. [...] However, further work is urgently needed both to confirm the clinical efficacy of fermentable carbohydrate restriction in a variety of clinical subgroups

and to fully characterize the effect on the gut microbiota and the colonic environ¬ment. Whether the effect on luminal bifidobacteria is clinically relevant, preventable, or long-lasting, needs to be investigated. The influence on nutrient intake and dietary diversity, which might also affect the gut microbiota,137 and quality of life also requires further exploration as does the possible economic effects due to reduced physician contact and need for medication. Although further work is required to confirm its place in IBS and functional bowel disorder clinical pathways, fermentable carbohydrate restriction is an important consideration for future national and international IBS guidelines.

89. Fedewa A, Rao SS (January 2014). "Dietary fructose intolerance, fructan intolerance, and FODMAPs". Current Gastroenterology Reports. 16 (1): 370. doi:10.1007/s11894-013-0370-0. PMC 3934501. PMID 24357350.
90. Gibson PR, Shepherd SJ (February 2010). "Evidence-based dietary management of functional gastrointestinal symptoms: The FODMAP approach". Journal of Gastroenterology and Hepatology. 25 (2): 252–8. doi:10.1111/j.1440-1746.2009.06149.x. PMID 20136989. S2CID 20666740.
91. Makharia A, Catassi C, Makharia GK (December 2015). "The Overlap between Irritable Bowel Syndrome and Non-Celiac Gluten Sensitivity: A Clinical Dilemma". Nutrients (Review). 7 (12): 10417–26. doi:10.3390/nu7125541. PMC 4690093. PMID 26690475.
92. Greer JB, O'Keefe SJ (2011). "Microbial induction of immunity, inflammation, and cancer". Frontiers in Physiology (Review). 1: 168. doi:10.3389/fphys.2010.00168. PMC 3059938. PMID 21423403.
93. Andoh A, Tsujikawa T, Fujiyama Y (2003). "Role of dietary fiber and short-chain fatty acids in the colon". Current Pharmaceutical Design (Review). 9 (4): 347–58. doi:10.2174/1381612033391973. PMID 12570825.
94. Turco R, Salvatore S, Miele E, Romano C, Marseglia GL, Staiano A (May 2018). "Does a low FODMAPs diet reduce symptoms of functional abdominal pain disorders? A systematic review in adult and pediatric population, on behalf of Italian Society of Pediatrics". Italian Journal of Pediatrics (Systematic Review). 44 (1): 53. doi:10.1186/s13052-018-0495-8. PMC 5952847. PMID 29764491.
95. Marsh A, Eslick EM, Eslick GD (April 2016). "Does a diet low in FODMAPs reduce symptoms associated with functional gastrointestinal disorders? A comprehensive systematic

review and meta-analysis". European Journal of Nutrition. 55 (3): 897–906. doi:10.1007/s00394-015-0922-1. PMID 25982757. S2CID 206969839.

96. Tuck CJ, Muir JG, Barrett JS, Gibson PR (September 2014). "Fermentable oligosaccharides, disaccharides, monosaccharides, and polyols: role in irritable bowel syndrome". Expert Review of Gastroenterology & Hepatology. 8 (7): 819–34. doi:10.1586/17474124.2014.917956. PMID 24830318. S2CID 28811344.
97. Heiman ML, Greenway FL (May 2016). "A healthy gastrointestinal microbiome is dependent on dietary diversity". Molecular Metabolism (Review). 5 (5): 317–320. doi:10.1016/j.molmet.2016.02.005. PMC 4837298. PMID 27110483.
98. Staudacher HM, Whelan K (August 2017). "The low FODMAP diet: recent advances in understanding its mechanisms and efficacy in IBS". Gut (Review). 66 (8): 1517–1527. doi:10.1136/gutjnl-2017-313750. PMID 28592442. S2CID 3492917.
99. Hou JK, Lee D, Lewis J (October 2014). "Diet and inflammatory bowel disease: a review of patient-targeted recommendations". Clinical Gastroenterology and Hepatology (Review). 12 (10): 1592–600. doi:10.1016/j.cgh.2013.09.063. PMC 4021001. PMID 24107394. Even less evidence exists for the efficacy of the SCD, FODMAP, or Paleo diet. Furthermore, the practicality of maintaining these interventions over long periods is doubtful. At a practical level, adherence to defined diets may result in an unnecessary financial burden or reduction in overall caloric intake in people who are already at risk for protein-calorie malnutrition.
100. Barrett JS (March 2017). "How to institute the low-FODMAP diet". Journal of Gastroenterology and Hepatology (Review). 32 (Suppl 1): 8–10. doi:10.1111/jgh.13686. PMID 28244669. S2CID 24990614. Common symptoms of IBS are bloating, abdominal pain, excessive flatus, constipation, diarrhea, or alternating bowel habit. These symptoms, however, are also common in the presentation of coeliac disease, inflammatory bowel disease, defecatory disorders, and colon cancer. Confirming the diagnosis is crucial so that appropriate therapy can be undertaken. Unfortunately, even in these alternate diagnoses, a change in diet restricting FODMAPs may improve symptoms and mask the fact that the correct diagnosis has not been made. This is the case with coeliac disease where a low-FODMAP diet can concurrently reduce dietary gluten, improving symptoms, and also affecting coeliac diagnostic indices.3,4 Misdiagnosis of intestinal diseases can lead to secondary problems such as nutritional deficiencies, cancer risk, or even mortality in the case of colon cancer.

101. "Celiac disease". World Gastroenterology Organisation Global Guidelines. July 2016. Archived from the original on 17 March 2017. Retrieved 4 June 2018.

102. Francis CY, Whorwell PJ (July 1994). "Bran and irritable bowel syndrome: time for reappraisal". Lancet. 344 (8914): 39–40. doi:10.1016/S0140-6736(94)91055-3. PMID 7912305. S2CID 34156816.

103. Shen YH, Nahas R (February 2009). "Complementary and alternative medicine for the treatment of irritable bowel syndrome". Canadian Family Physician. 55 (2): 143–8. PMC 2642499. PMID 19221071.

104. Bijkerk CJ, de Wit NJ, Muris JW, Whorwell PJ, Knottnerus JA, Hoes AW (August 2009). "Soluble or insoluble fiber in irritable bowel syndrome in primary care? Randomised placebo-controlled trial". BMJ. 339 (b3154): b3154. doi:10.1136/BMJ.b3154. PMC 3272664. PMID 19713235.

105. Ducrotté P (November 2007). "[Irritable bowel syndrome: current treatment options]". Presse Médicale. 36 (11 Pt 2): 1619–26. doi:10.1016/j.lpm.2007.03.008. PMID 17490849.

106. Bijkerk CJ, Muris JW, Knottnerus JA, Hoes AW, de Wit NJ (February 2004). "Systematic review: the role of different types of fiber in the treatment of irritable bowel syndrome". Alimentary Pharmacology & Therapeutics. 19 (3): 245–51. doi:10.1111/j.0269-2813.2004.01862.x. PMID 14984370. S2CID 38345912.

107. Bijkerk CJ, de Wit NJ, Muris JW, Whorwell PJ, Knottnerus JA, Hoes AW (August 2009). "Soluble or insoluble fiber in irritable bowel syndrome in primary care? Randomised placebo-controlled trial". BMJ. 339 (b): b3154. doi:10.1136/BMJ.b3154. PMC 3272664. PMID 19713235.

108. Prior A, Whorwell PJ (November 1987). "Double-blind study of ispaghula in irritable bowel syndrome". Gut. 28 (11): 1510–3. doi:10.1136/gut.28.11.1510. PMC 1433676. PMID 3322956.

109. Jalihal A, Kurian G (1990). "Ispaghula therapy in irritable bowel syndrome: improvement in overall well-being is related to the reduction in bowel dissatisfaction". Journal of Gastroenterology and Hepatology. 5 (5): 507–13. doi:10.1111/j.1440-1746.1990.tb01432.x. PMID 2129822. S2CID 4666481.

110. Kumar A, Kumar N, Vij JC, Sarin SK, Anand BS (February 1987). "Optimum dosage of ispaghula husk in patients with irritable bowel syndrome: correlation of symptom relief with

whole gut transit time and stool weight". Gut. 28 (2): 150–5. doi:10.1136/gut.28.2.150. PMC 1432983. PMID 3030900.

111. Ruepert L, Quartero AO, de Wit NJ, van der Heijden GJ, Rubin G, Muris JW (August 2011). "Bulking agents, antispasmodics and antidepressants for the treatment of irritable bowel syndrome". The Cochrane Database of Systematic Reviews (8): CD003460. doi:10.1002/14651858.CD003460.pub3. PMID 21833945. S2CID 22977015.

112. Joo JS, Ehrenpreis ED, Gonzalez L, Kaye M, Breno S, Wexner SD, Zaitman D, Secrest K (June 1998). "Alterations in colonic anatomy induced by chronic stimulant laxatives: the cathartic colon revisited". Journal of Clinical Gastroenterology. 26 (4): 283–6. doi:10.1097/00004836-199806000-00014. PMID 9649012

113. Xu D, Chen VL, Steiner CA, Berinstein JA, Eswaran S, Waljee AK, et al. (July 2019). "Efficacy of Fecal Microbiota Transplantation in Irritable Bowel Syndrome: A Systematic Review and Meta-Analysis". The American Journal of Gastroenterology. 114 (7): 1043–1050. doi:10.14309/ajg.0000000000000198. PMC 7257434. PMID 30908299.

114. Wilkins T, Pepitone C, Alex B, Schade RR (September 2012). "Diagnosis and management of IBS in adults". American Family Physician. 86 (5): 419–26. PMID 22963061.

115. Rösch W, Liebregts T, Gundermann KJ, Vinson B, Holtmann G (2006). "Phytotherapy for functional dyspepsia: a review of the clinical evidence for the herbal preparation STW 5". Phytomedicine. 13 (Suppl 5): 114–21. doi:10.1016/j.phymed.2006.03.022. PMID 16978851.

116. Alammar N, Wang L, Saberi B, Nanavati J, Holtmann G, Shinohara RT, Mullin GE (January 2019). "The impact of peppermint oil on the irritable bowel syndrome: a meta-analysis of the pooled clinical data". BMC Complementary and Alternative Medicine. 19 (1): 21. doi:10.1186/s12906-018-2409-0. PMC 6337770. PMID 30654773.

117. Hungin, A. P. S., Chang, L., Locke, G. R., Dennis, E. H., & Barghout, V. (2005). Irritable bowel syndrome in the United States: prevalence, symptom patterns, and impact. Alimentary pharmacology & therapeutics, 21(11), 1365-1375.

118. Spiller, R., & Garsed, K. (2009). Postinfectious irritable bowel syndrome. Gastroenterology, 136(6), 1979-1988.

119. Jones, R., & Lydeard, S. (1992). Irritable bowel syndrome in the general population. British Medical Journal, 304(6819), 87-90.

120. Hungin, A. P. S., Chang, L., Locke, G. R., Dennis, E. H., & Barghout, V. (2005). Irritable bowel syndrome in the United States: prevalence, symptom patterns, and impact. Alimentary pharmacology & therapeutics, 21(11), 1365-1375.

121. Bensoussan, A., Talley, N. J., Hing, M., Menzies, R., Guo, A., & Ngu, M. (1998). Treatment of irritable bowel syndrome with Chinese herbal medicine: a randomized controlled trial. Jama, 280(18), 1585-1589.