



# Case Study: The dietary management of irritable bowel syndrome

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## Introduction

Irritable bowel syndrome (IBS) is a disorder defined by the presence of recurring episodes of abdominal pain in association with altered bowel habits and no evidence of a structural or easily identifiable biochemical abnormality that might explain these symptoms.<sup>1</sup>

IBS affects up to 20% of the population, making it a fairly common gastrointestinal (GI) disorder, and affects more women than men. As a chronic, functional GI disorder, it significantly decreases patients' quality of life.<sup>1-3</sup>

The Rome Criteria is the standard symptoms-based criteria for the diagnosis of IBS. The Rome IV criteria has recently replaced the Rome III version (Table 1).<sup>4</sup>

There are significant differences between Rome IV and Rome III criteria. "Discomfort" has been removed from the criteria (Table 1; Box 1); only what is volunteered as "pain" meets the major criterion. The threshold for symptomatic periods has been raised to an average of once a week from the previous three times per month. It is no longer assumed that pain necessarily begins at the same time changes in stools frequency and consistency occur, but rather that of symptoms association. Pain relief after defecation has been removed from the criteria and replaced by pain related to defecation. Finally, subtyping of IBS into diarrhea-predominant,

constipation-predominant, mixed or unsubtyped is now not dependent on specific numerical percentages of specific stool types but on the patient's report of the stool frequency of types based on the standard Bristol Stool Scale.<sup>4</sup>

### Box 1: Common symptoms of IBS include<sup>1</sup>:

#### Lower GI:

- Abdominal pain
- Bloating
- Constipation & / or alternating with
- Diarrhoea

#### Upper GI

- Often also nausea, gastro-esophageal reflux disease

#### Systematic

- Fatigue/lethargy
- Dizziness

When investigating the pathophysiology of IBS, the literature includes several possible factors, including disturbed motility, the gut-brain axis (GBA), genetic factors, impaired gut-barrier function, immunologic dysregulation, the gut microbiome and psychological factors.<sup>1</sup>

The contractions and relaxation of the GIT (gastrointestinal tract) necessary to move food through the GIT is called gastrointestinal motility. Many factors, for example physical exercise and emotional distress can affect motility. More recently, there is evidence that low-

Table 1: Differences between the Rome III and Rome IV criteria for diagnosing IBS

The Rome III Criteria states that IBS includes: <sup>4</sup>	The Rome IV Criteria states that IBS is characterized by (more recently published): <sup>4</sup>
<p>Recurrent abdominal pain or discomfort at least 3 days per month for past 3 months, with symptom onset &gt;6 months before diagnosis, associated with 2 or more of the following:</p> <ul style="list-style-type: none"> <li>• Improvement with defecation</li> <li>• Onset associated with a change in frequency of stool</li> <li>• Onset associated with a change in stool form /appearance</li> </ul>	<p>Recurrent abdominal pain on average at least 1 day a week in the last 3 months associated with two or more of the following:</p> <ul style="list-style-type: none"> <li>• Associated with a change in a frequency of stool</li> <li>• Associated with a change in form (consistency) of stool.</li> <li>• Symptoms must have started at least in the preceding 6 months</li> </ul>



grade mucosal inflammation and immune activation (particularly with mast cell involvement) in association with impaired epithelial barrier function and neuronal sensitivity may play a role in functional gastrointestinal disorders.<sup>1</sup>

The GBA denotes a phenomenon of two-way communication between the central and the enteric nervous system, linking emotional and cognitive centers of the brain with peripheral intestinal functions. The interaction between microbiota and GBA occurs through signaling from gut-microbiota to brain and from brain to gut-microbiota by means of neural, endocrine, immune, and humoral links.<sup>5</sup> The available evidence indicates that both brain-gut and gut-brain dysfunctions may occur, the former being dominant particularly in irritable bowel syndrome (IBS). The disruption occurring in the GBA determines the changes in intestinal motility and secretion, causes visceral hypersensitivity and leads to cellular alterations of the entero-endocrine and immune systems. Microbiota may interplay with multiple of these different pathophysiological IBS targets.<sup>5</sup>

### Case study

Mrs. K, a 38-year-old female made an appointment out of her own accord with the dietitian regarding her ongoing 8 years battle with irritable bowel syndrome (IBS). She had previously seen a gastroenterologist who confirmed her diagnosis.

Medical conditions relevant to IBS included post-traumatic stress disorder (PTSD) post birth of a child. Previous herbal/natural antidepressants were used and the patient has a history of using a PPI (Proton pump inhibitor) and Sucralfate (liquid antacid) as needed due to stomach ulcers (approximately 9 years ago). Her current medication included Mebeverine (135 mg tablets; a well-known anti-spasmodic) and “anti-nausea” (Cyclizine 50mg tablets) as needed. A probiotic (9-strain) capsule was taken once per day. Her symptoms included bloating and gassiness, loose bowel movements up to four times per day as well as episodes of cold sweats, shaking and severe diarrhoea when eating out at family or restaurants; especially if food eaten was fatty /oily and alcohol was consumed.

Gastroscopy and colonoscopy were normal, as was her lactose tolerance test, all performed in 2015.

Lactose tolerance can be tested using the hydrogen breath test or blood tests.<sup>6</sup> Testing is ordered when a person has signs and symptoms that suggest lactose intolerance that develop 30 minutes to 2 hours after ingesting milk or other dairy products. Some of these include abdominal pain and bloating, diarrhoea, nausea and or flatulence. With hydrogen breath testing, a baseline breath sample is taken before giving a lactose-loaded drink. If the hydrogen gas in a person’s breath significantly increases from the baseline, then it is likely that the person is lactose intolerant.<sup>6</sup>

In this case, timed samples of blood were taken and measured for glucose following a standard dose (100 g) of lactose orally. If the glucose levels following the lactose ingestion do not increase, yet the person still has symptoms consistent with lactose intolerance, then the condition is likely present. Increasing blood glucose levels over the course of the test indicate that signs and symptoms are

unlikely to be due to lactose intolerance. In this patient’s case, blood glucose rose to 1.8 mmol/l (a blood glucose rise above 1.7 mmol/l at any point in the test considered normal).<sup>6</sup> However, the patient volunteered that she definitely “reacted” to dairy products and that there was a family history of lactose intolerance.

Further upon evaluation, the patient enjoyed running and her dietary history was remarkable for an alcohol intake of 1–2 glasses white wine per night, max 3–4 glasses over the weekend; occasional Irish coffee; chewing gum during the day; a fluid intake of coffee 2–3 cups per day, Ceylon tea, flavoured water and water, a high fibre diet (consisting of bran or muesli rusks, seed loaf bread, fruits such as apple, plenty of vegetables); cheese, nuts and biltong; and evening meals were sometimes ready to eat, purchased from a food shop.

### Treatment

The patient was asked to keep a food and symptoms diary for 3 weeks, was provided with the general IBS dietary guidelines as well as a meal plan with sufficient energy, and was advised to use lactose free milk.

#### Follow up three weeks after the initial consultation:

The patient reported a definite improvement in symptoms when cutting down on her caffeine intake and replacing it with more water and rooibos tea. The patient also recorded one episode of shaking and diarrhoea when eating out at a restaurant.

Lactose free milk appeared to elicit fewer problems with her colon. Dairy definitely caused cramps and pain, especially when cheese was consumed in large portions. Trigger foods identified through a comprehensive food diary included: onion, especially raw, garlic, fatty foods, especially cheese cake and take-away burger and chips.

The patient was relieved to see that with the changes in her diet, her bowel movements were more formed and a normal pattern was established. Mebeverine was used occasionally before a meal, if the patient felt particularly uncomfortable.

#### Dietary modifications for IBS symptoms

Dietary and lifestyle modification can be beneficial for these patients, as more than 60% of IBS patients report worsening symptoms after meals, sometimes directly after meals, but more often within 3 hours of eating.<sup>1</sup> Individual dietary counselling and including more soluble fibre, and avoiding insoluble fibre and high-FODMAP (fermentable oligo di and monosaccharides and polyols) foods (Table 2) can be highly beneficial to this patient population.<sup>2</sup>

The dietary treatment of IBS has been a much debated and researched topic in recent years. Unfortunately, patients often go to extreme measures and are subjected to a plethora of dietary information from different sources before consulting a medical professional.

Trigger foods most sighted by patients include milk and dairy products, wheat products, caffeine, cabbage, onions, peas, hot spices and fried and smoked foods.<sup>2</sup> Patients often sight food allergies or intolerances as the basis of their IBS symptoms. In truth,



true food allergies are present in 1–4% of the population, but are not more prevalent in IBS.<sup>2</sup>

There is evidence of some changes in nutrient-related GI functions in IBS, for example exaggerating gastro-colonic reflex, enhanced sensitization to rectal distention after consuming fat, and changes in colonic bacterial flora that may be relevant for the fermentation of non-absorbable foods.<sup>1</sup>

The British Dietetic Association provides a dietetic care pathway followed by a systemic treatment, including 3 lines of dietary management for IBS<sup>3</sup>:

- **First-line:** clinical and dietary evaluation and healthy eating management with general guidance on lactose and non-starch polysaccharides (NSP).
- **Second-line:** dietary interventions to alleviate symptoms resulting from NSP and fermentable carbohydrates and use of probiotics.
- **Third-line:** elimination and empirical diets.

Dietary guidelines should be provided to patient based on symptoms and adjusted to the sub-type of IBS the patient is suffering from.<sup>3</sup>

### FODMAPs

FODMAPs are Fermentable Oligo (fructans {inulin, FOS} – CHO chain >10 & galactans) Disaccharides (lactose) Monosaccharides (fructose) And Polyols (sorbitol, mannitol, xylitol, maltitol).<sup>7</sup>

Short chain carbohydrates are poorly absorbed in the small intestine, enter the colon, and are fermented, causing gas and distention.<sup>6</sup> Manipulation of diet may affect gas production and symptoms in IBS patients. Studies have shown that up to three quarters of patients with IBS responded favourably (symptoms were reduced) when FODMAPs (Table 2) were restricted. Patients should be advised to follow a low-FODMAP diet for 6-8 weeks, and then start to broaden the scope of the diet, examining their tolerance to different foods in order to stabilise their diet in the longer term.<sup>8</sup>

Fructose intake has increased over the decades due to increase fruit

juices and high fructose corn syrup in foods and beverages. Fructose relies on glucose transporters for absorption and an ingestion of large amounts of fructose can cause malabsorption. Fructose distends the small bowel with water, causing bloating.<sup>8</sup>

If food/beverage contains small amounts fructose and glucose, then they are allowed on low FODMAP diet, as glucose enhances fructose absorption.<sup>7</sup>

Although this approach is successful in many patients, the low-FODMAP diet is very restrictive and requires intense dietetic input. Only a minority of the initially restricted foods are avoided in the longer term diet, most likely because of the individual variance in the severity of malabsorption and bacterial fermentation of malabsorbed carbohydrates.<sup>7</sup>

### The role of probiotics in IBS

A probiotic is a live microbial organism that, when ingested in beneficial numbers, can provide a health benefit to the host. Most common microbial organisms include Lactobacilli and Bifidobacteria.<sup>8-10</sup> Studies have shown improvement in IBS visceral hypersensitivity, dysmotility, intestinal permeability and improved immune function with the use of probiotics. *Bifidobacterium infantis* 35624 at a dose of 1 X 10<sup>8</sup> CFUs per day, taken for at least a month resulted in reduced pain, bloating and improved bowel satisfaction scores in IBS.<sup>11</sup>

Gut microbiota is thought to play important roles in the pathogenesis of IBS. This is evident from the fact that IBS occurs more frequently after intestinal infection or antibiotics treatment. Studies have shown a change in the intestinal microbiota observed in IBS patients.<sup>11</sup> Published studies have reported an incidence of post infective IBS to range between 5% and 32%.<sup>11</sup> The mechanisms underlying the development of this are not fully understood, but are believed to include persistent sub-clinical inflammation, changes in intestinal permeability and alteration of gut microflora. Considering the relationship between alteration of gut microflora and inflammation of the gut, manipulation of the gut microbiota by probiotics appears

Table 2: Foods high in FODMAPs<sup>7,9</sup>

Fructose	Polyols	Lactose	Fructans and Galactans
<ul style="list-style-type: none"> <li>• Apples</li> <li>• Pears</li> <li>• Watermelon</li> <li>• Honey</li> <li>• Fruit juices</li> <li>• Dried fruits</li> <li>• High-fructose corn syrup</li> </ul>	<ul style="list-style-type: none"> <li>• Sugar alcohols (mannitol, sorbitol, maltitol, xylitol, isomalt)</li> <li>• Stone fruits</li> <li>• Avocado</li> <li>• Mushrooms</li> <li>• Cauliflower</li> </ul>	<ul style="list-style-type: none"> <li>• Milk (cow, goat, sheep)</li> <li>• Yoghurt</li> <li>• Soft cheese (ricotta, cottage)</li> <li>• Cream</li> <li>• Ice cream</li> <li>• Custard</li> </ul>	<ul style="list-style-type: none"> <li>• Wheat</li> <li>• Wheat pasta</li> <li>• Rye</li> <li>• Garlic</li> <li>• Garlic salts</li> <li>• Onions</li> <li>• Asparagus</li> <li>• Inulin</li> <li>• Soy</li> <li>• Leeks</li> <li>• Legumes</li> <li>• Cabbage</li> <li>• Brussel's sprouts</li> <li>• Broccoli</li> <li>• Sugar snap peas</li> <li>• Celery</li> <li>• Sweet corn</li> </ul>



**Table 3: Probiotic preparations shown to have an effect on IBS symptoms in adults<sup>11</sup>**

Reduction of global score	<i>S faecium</i> <i>Lactobacillus acidophilus</i> <i>L plantarum</i> 299V <i>Bifidobacterium infantis</i> 35624 <i>Bifidobacterium bifidum</i> MIMBb75 Mixture ( <i>L ramnossus</i> , <i>L salivarius</i> , <i>S faecium</i> , <i>L reuterii</i> )
Pain reduction	<i>Bifidobacterium infantis</i> 35624 Mixture (4 strain)
Less bloating and flatulence	VSL#3

to be beneficial treatment for IBS. However, the beneficial effects and efficacy of altering gut microbiota by probiotics to improve the symptoms of IBS have not been consistent in clinical trials and further research is needed.<sup>12</sup>

It is important to keep in mind that in order for probiotics to be effective, they must be acid enzyme resistant, have good mucosal adherence and be consumed in sufficient quantities. Regular intake for at least 4 weeks is advised, and then continued use if the desired effect was observed. It is also important to warn patients that probiotics are generally regarded as safe in the treatment of IBS, but some may experience aggravated symptoms.<sup>13</sup>

### Conclusion

IBS is a complex disorder, affecting patients' quality of life. As its pathophysiology includes psychological, physiological and dietary factors, a holistic approach is needed in the management of symptoms. As every individual's circumstances are different, it is important to take into account the patients' dietary habits as well as their daily routine. An individualized approach, avoiding trigger foods and circumstances, as well as providing ongoing nutrition counselling can significantly improve symptoms as well as a feeling of autonomy in these patients.

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