ClinicalEvidence

Irritable bowel syndrome: dietary interventions

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ABSTRACT

INTRODUCTION: The prevalence of irritable bowel syndrome (IBS) varies depending on the criteria used to diagnose it, but it ranges from about 5% to 20%. IBS is associated with abnormal gastrointestinal motor function and enhanced visceral perception, as well as psychosocial and genetic factors. People with IBS often have other bodily and psychiatric symptoms, and have an increased likelihood of having unnecessary surgery compared with people without IBS. METHODS AND OUTCOMES: We conducted a systematic overview, aiming to answer the following clinical question: What are the effects of dietary modification (gluten-free diet, a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols [FODMAPs]) in people with irritable bowel syndrome? We searched Medline, Embase, The Cochrane Library, and other important databases up to June 2014 (BMJ Clinical Evidence reviews are updated periodically; please check our website for the most up-to-date version of this review). RESULTS: At this update, searching of electronic databases retrieved 33 studies. After deduplication and removal of conference abstracts, 19 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 14 studies and the further review of five full publications. Of the five full articles evaluated, three RCTs were included. Based upon their own search, the contributor(s) added two additional RCTs that did not meet BMJ Clinical Evidence inclusion criteria; these have been added to the Comment section. We performed a GRADE evaluation of the quality for two PICO combinations. CONCLUSIONS: In this systematic overview, we categorised the efficacy for two interventions based on information relating to the effectiveness and safety of dietary modification (gluten-free diet or a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols [FODMAPs]).

QUESTIONS

INTERVENTIONS

Key points

- The key features of irritable bowel syndrome (IBS) are chronic, recurrent abdominal pain or discomfort, associated with disturbed bowel habit, in the absence of any structural abnormality to account for these symptoms.

  The prevalence of IBS varies depending on the criteria used to diagnose it, but it ranges from about 5% to 20%.

  IBS is associated with abnormal GI motor function, enhanced visceral perception, abnormalities in central pain processing, and altered gut flora, as well as psychosocial and genetic factors.

  People with IBS often have other bodily and psychiatric symptoms, and have an increased likelihood of having unnecessary surgery compared with people without IBS.

  A positive symptom-based diagnosis and a graded general treatment approach are cornerstones in the management of people with IBS.

  Pharmacological agents, including antispasmodics, antidepressants, and secretagogues, are effective therapies in IBS, but none have been shown to alter the long-term natural history of the condition.

  Some people with IBS believe that certain foods trigger their symptoms and would, therefore, rather try dietary modification as a first-line approach instead of taking drugs, which may have side effects.

- We searched for RCTs and systematic reviews of RCTs on gluten-free diets or diets low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (low- FODMAP diet) compared with normal diet or general dietary advice, or compared with standard usual care (e.g., antispasmodic treatment).

- We don't know if a gluten-free diet is more effective than a normal gluten-containing diet in controlling symptoms in IBS, as there were few studies, and results were inconsistent.

  RCTs recruited people with IBS, in whom coeliac disease had already been excluded by either serological testing or small intestinal biopsy. The RCTs were conducted in specialist centres, so the results may not be generalisable to patients seen in primary care.

  Adverse events are unlikely in the short-term and, for people who are keen to avoid pharmacological therapies due to concerns about side effects (particularly those in whom pain or bloating is the predominant symptom), a trial of a gluten-free diet, instituted with the help of a trained dietitian, may be worthwhile.

- We don't know if a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (low-FODMAP diet) is more effective than a normal diet in controlling symptoms in IBS, as there was only one trial providing evidence of low quality for a clinically significant benefit.

As with gluten-free diets, adverse events are unlikely in the short-term and, for people who are keen to avoid pharmacological therapies due to concerns about side effects (particularly those in whom pain or bloating is the predominant symptom), a trial of a low-FODMAP diet may be worthwhile.

Clinical context

GENERAL BACKGROUND

Irritable bowel syndrome (IBS) is a highly prevalent chronic condition. The key features of IBS are chronic, recurrent abdominal pain or discomfort, associated with disturbed bowel habit, in the absence of any structural abnormality to account for these symptoms.

FOCUS OF THE REVIEW

While some pharmacological therapies (including antispasmodic drugs, antidepressants, and secretagogues) are effective, none have been proven to alter the long-term natural history of the disorder. Some patients with IBS would rather try out alternative non-pharmacological therapies. Partly as a result of this, over the last 5 years or so, interest has turned towards assessing the efficacy of dietary interventions in IBS. This overview has focused on examining the evidence available for two such dietary modifications, a gluten-free diet and a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs).

COMMENTS ON EVIDENCE

There is, as yet, insufficient evidence to make firm judgements on whether gluten-free diet is more effective than a normal gluten-containing diet in controlling symptoms in IBS. Ideally, larger RCTs are required, although conducting dietary intervention trials in large numbers of patients is difficult. The RCTs we found included small numbers of participants and were conducted in specialist centres, so the results may not be generalisable to patients seen in primary care. For diets low in FODMAPs, there is equally insufficient and low-quality evidence; although, one small cross-over RCT suggests that they may be more effective at improving gastrointestinal symptoms in people with IBS compared with a normal diet.

SEARCH AND APPRAISAL SUMMARY

The literature search was carried out in June 2014. For more information on the electronic databases searched and criteria applied during assessment of studies for potential relevance to the overview, please see the Methods section. Searching of electronic databases retrieved 33 studies. After deduplication and removal of conference abstracts, 19 records were screened for inclusion in the review. Appraisal of titles and abstracts led to the exclusion of 14 studies and the further review of five full publications. Of the five full articles evaluated, three RCTs were included. Based upon their own search, the contributor(s) added two additional RCTs that did not meet *BMJ Clinical Evidence* inclusion criteria to the Comment section.

ADDITIONAL INFORMATION

Despite the lack of evidence, for people who feel that their symptoms are worse with gluten-containing foods, a trial of a gluten-free diet is not unreasonable; particularly. in a patient who is keen to avoid drugs and their potential side effects. This would need the involvement of a trained registered dietitian. Similarly, as adverse events are unlikely, a trial of a low-FODMAP diet may be worthwhile in patients with IBS who are keen to avoid pharmacological therapies due to concerns about side effects in the short-term, although it should be noted that the long-term consequences of restrictive diets such as these, in terms of their effect on nutritional status and general health, is unknown.

DEFINITION

Irritable bowel syndrome (IBS) is a chronic functional condition of the lower GI tract characterised by abdominal pain or discomfort and disordered bowel habit (diarrhoea, constipation, or fluctuation between the two). There is no known structural or biochemical explanation for the symptoms. Symptom-based criteria, such as the Manning criteria (see table 1, p 13) [1] and the latest revision of the Rome criteria, the Rome III criteria (see table 2, p 13), [2] aid diagnosis, but their main use is in recruiting patients for clinical trials. The Rome III criteria subcategorise IBS according to predominant symptom (diarrhoea, constipation, or alternating bowel habit). In practice, the division between constipation-predominant and diarrhoea-predominant IBS may not be clear-cut in all people, particularly as individuals often change subcategory during follow-up. [3] Restriction of trial entry to a subcategory of IBS limits the generalisability of some RCT results.

INCIDENCE/ PREVALENCE

Estimates of incidence and prevalence of IBS vary depending on the diagnostic criteria used to define the condition. One cross-sectional survey conducted in the UK defined IBS as recurrent abdominal pain on more than six occasions during the previous year plus two or more of the Manning criteria (see table 1, p 13). [4] It estimated prevalence in the UK to be 17% overall, with 23% among women and 11% among men. [4] An Australian study reported the prevalence to be

14% using the Manning criteria, 7% using the Rome I criteria, and 4% using the Rome II criteria. [5] A cross-sectional survey of almost 4000 individuals in the UK with 10 years of follow-up estimated the incidence of IBS, defined using the Manning criteria, to be 1.5% a year. [6]

AETIOLOGY/ RISK FACTORS

The pathophysiology of IBS is uncertain, and it is unlikely that a single unifying mechanism explains the condition, but abnormal GI motor function, [7] [8] [9] enhanced visceral perception, [10] [11] [12] and abnormalities of central pain processing [12] [13] seem important. Other determinants include psychosocial factors such as a history of childhood abuse, [14] genetic predisposition, [15] [16] [17] a history of exposure to acute enteric infection, [18] [19] so-called post-infectious IBS, and abnormalities in gut flora. [20]

PROGNOSIS

A retrospective study reviewed the medical records of people with IBS (112 people aged 20–64 years when diagnosed with IBS at the Mayo Clinic, US, between 1961 and 1963). IBS was defined as the presence of abdominal pain associated with either disturbed defecation or abdominal distension, and the absence of organic bowel disease. [21] Over a 32-year period, less than 10% of people developed organic GI disease subsequently, and death rates were similar among people with IBS compared with age- and sex-matched controls. In another study conducted in the US, individuals meeting diagnostic criteria for IBS were followed up for between 10 and 13 years, during which time almost 50% had undergone subsequent investigation of the lower GI tract, yet this had not led to a revision of the diagnosis of IBS in any of the patients. [22] Other investigators have reported that people with IBS are two to three times more likely to undergo unnecessary surgical procedures, such as cholecystectomy, hysterectomy, or appendicectomy. [4] [23] [24]

AIMS OF INTERVENTION

To improve symptoms and reduce disability, with minimal adverse effects.

OUTCOMES

Symptom improvement, in particular, improvement in abdominal pain, constipation, diarrhoea, bloating, and urgency of defecation, measured using validated self-report instruments (including adequate relief, [25] the Irritable Bowel Severity Scoring System, [26] the Gastrointestinal Symptom Rating Scale, [27] [28] the Functional Bowel Disorder Severity Index, [29] and the IBS Symptom Questionnaire [29]); **quality of life** measured using validated instruments (including Quality of Life and Global Impact of IBS, the Irritable Bowel Syndrome Quality of Life Measurement, [30] [31] the Irritable Bowel Syndrome Quality of Life Questionnaire, [32] the Digestive Health Status Instrument, [33] the Functional Digestive Disorder Quality of Life Questionnaire, [34] and the Irritable Bowel Syndrome Health-Related Quality-of-Life questionnaire [35]); **adverse effects**.

METHODS

Search strategy *BMJ Clinical Evidence* search and appraisal June 2014. Databases used to identify studies for this systematic review include: Medline 1966 to June 2014, Embase 1980 to June 2014, The Cochrane Database of Systematic Reviews, 2014, issue 6 (1966 to date of issue), the Database of Abstracts of Reviews of Effects (DARE), and the Health Technology Assessment (HTA) database. **Inclusion criteria** Study design criteria for inclusion in this review were systematic reviews and RCTs published in English, at least single-blinded, with no minimum sample size or maximum loss to follow-up. There was no minimum length of follow-up. We excluded all studies described as 'open', 'open label', or not blinded unless blinding was impossible. *BMJ Clinical Evidence* does not necessarily report every study found (e.g., every systematic review). Rather, we report the most recent, relevant and comprehensive studies identified through an agreed process involving our evidence team, editorial team, and expert contributors. **Evidence evaluation** A systematic literature search was conducted by our evidence team, who then assessed titles and abstracts, and finally selected articles for full text appraisal against inclusion and exclusion criteria agreed a priori with our expert contributors. In consultation with the expert contributors, studies were selected for inclusion and all data relevant to this overview extracted into the benefits and harms section of the overview. In addition, information that did not meet our predefined criteria for inclusion in the benefits and harms section, may have been reported in the 'Further information on studies' or 'Comment' section. **Adverse effects** All serious adverse effects, or those adverse effects reported as statistically significant, were included in the harms section of the overview. Pre-specified adverse effects identified as being clinically important were also reported, even if the results were not statistically significant. Although *BMJ Clinical Evidence* presents data on selected adverse effects reported in included studies, it is not meant to be, and cannot be, a comprehensive list of all adverse effects, contraindications, or interactions of included drugs or interventions. A reliable national or local drug database must be consulted for this information. **Comment and Clinical guide sections** In the Comment section of each intervention, our expert contributors may have provided additional comment and analysis of the evidence, which may include additional studies (over and above those identified via our systematic search) by way of background data or supporting information. As *BMJ Clinical Evidence* does not systematically search for studies reported in the Comment section, we cannot guarantee the completeness of the studies listed there or the robustness of methods. Our expert contributors add clinical context and interpretation to the Clinical guide sections where ap-

propriate. **Structural changes in this update** At this update, we have removed the following previously reported question from this overview: What are the effects of treatments in people with irritable bowel syndrome?. We have added the following question: What are the effects of dietary modification (gluten-free diet; a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols [FODMAPs]) in people with irritable bowel syndrome? **Data and quality** To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). *BMJ Clinical Evidence* does not report all methodological details of included studies. Rather, it reports by exception any methodological issue or more general issue that may affect the weight a reader may put on an individual study, or the generalisability of the result. These issues may be reflected in the overall GRADE analysis. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 13). The categorisation of the quality of the evidence (high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the Clinical Evidence population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION **What are the effects of dietary modification (gluten-free diet; a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols [FODMAPs]) in people with irritable bowel syndrome?**

OPTION **GLUTEN-FREE DIET** New

- For GRADE evaluation of interventions for Irritable bowel syndrome: dietary interventions, see table, p 13 .
- We don't know if a gluten-free diet is more effective than a normal gluten-containing diet at controlling symptoms in IBS, as there were few studies and results were inconsistent.
- RCTs recruited people with IBS, in whom coeliac disease had already been excluded by either serological testing or small intestinal biopsy. The RCTs were conducted in specialist centres, so the results may not be generalisable to patients seen in primary care.
- However, adverse events are unlikely in the short-term and, for people who are keen to avoid pharmacological therapies due to concerns about side effects (particularly those in whom pain or bloating is the predominant symptom), a trial of a gluten-free diet, instituted with the help of a trained dietitian, may be worthwhile.

Benefits and harms

Gluten-free diet versus normal diet or general dietary advice:

We found two RCTs that compared a normal or gluten-containing diet with a gluten-free diet in patients with irritable bowel syndrome (IBS). [36] [37]

Symptom improvement

Gluten-free diet compared with normal diet or general dietary advice We don't know if a gluten-free diet is more effective than a gluten-containing diet at improving symptoms in people with IBS, as results were inconsistent and from two small studies only (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Symptom improvement					
[37] RCT	45 people with diarrhoea-predominant IBS who had been having gluten in their diet before randomisation	**Difference in mean daily stool frequency** with gluten-free diet with gluten-containing diet Absolute results not reported	P = 0.04	○○○	gluten-free diet

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[37] RCT	45 people with diarrhoea-predominant IBS who had been having gluten in their diet before randomisation	**Difference in mean daily stool form** with gluten-free diet with gluten-containing diet Absolute results not reported	Reported as not significant P value not reported	⟷	Not significant
[37] RCT	45 people with diarrhoea-predominant IBS who had been having gluten in their diet before randomisation	**Difference in mean ease of passage score** with gluten-free diet with gluten-containing diet Absolute results not reported	P = 0.064	⟷	Not significant
[36] RCT	39 people with IBS fulfilling Rome III criteria (see table 2, p 13) that had improved on a gluten-free diet	**Symptoms not adequately controlled over previous week, for more than half of study period (self-reported)** 6/15 (40%) with gluten-free diet 13/19 (68%) with gluten-containing diet	P = 0.001	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Overall symptoms (measured on visual analogue scale [VAS]) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.047	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Overall symptoms (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.15 Linear mixed effects model	⟷	Not significant
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Bloating (measured on VAS 0–100) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.031	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Pain (measured on VAS 0–100) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.016	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Pain (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet	P = 0.02 Linear mixed effects model	○○○	gluten-free diet

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		Absolute results reported graphically 34 people in this analysis			
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Satisfaction with stool consistency (measured on VAS 0–100) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.024	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Satisfaction with stool consistency (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.03 Linear mixed effects model	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Tiredness (measured on VAS 0–100) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.001	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Tiredness (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.001 Linear mixed effects model	○○○	gluten-free diet
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Wind (measured on VAS 0–100) , at 1 week** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.053	⟷	Not significant
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Wind (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.08 Linear mixed effects model	⟷	Not significant
[36] RCT	39 people with IBS fulfilling Rome III criteria that had	**Nausea (measured on VAS 0–100) , at 1 week** with gluten-free diet	P = 0.120	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
	improved on a gluten-free diet	with gluten-containing diet Absolute results reported graphically 34 people in this analysis			
[36] RCT	39 people with IBS fulfilling Rome III criteria that had improved on a gluten-free diet	**Nausea (measured on VAS 0–100) , over entire study period** with gluten-free diet with gluten-containing diet Absolute results reported graphically 34 people in this analysis	P = 0.69 Linear mixed effects model	⟷	Not significant

Quality of life

No data from the following reference on this outcome. [36] [37]

Adverse effects

No data from the following reference on this outcome. [36] [37]

Gluten-free diet versus standard usual care:

We found no systematic reviews or RCTs.

Further information on studies

[37] Prior to study entry, the baseline number of gluten-containing food servings per day ranged from 1 to 15, with 90% of participants having between 1.0 and 4.4 servings per day. All meals were ingested or prepared at the research unit. Participants were also given snacks and advised to only eat foods provided by the study dietitians throughout the 4-week study period. Adherence was assessed by direct questioning from dietitians when participants collected meal and snack supplies.

[36] The RCT compared a gluten-containing diet with placebo in people with IBS who were on a gluten-free diet at randomisation. All participants enrolled in the study were required to have improved on a gluten-free diet and had adhered to the diet for at least 6 weeks immediately before screening. There was a 2-week run-in period where all participants were given a gluten-free diet. Subsequently, the gluten arm consumed gluten-containing muffins and bread (1 muffin and 2 slices of bread per day, 16 g/day of gluten), whereas the placebo group consumed gluten-free muffins and bread; the rest of their dietary intake remained gluten-free for both groups. Preliminary testing had shown that the gluten-containing and gluten-free products could not be distinguished on the basis of taste or texture. After randomisation, one person in the gluten-containing diet group and three in the gluten-free diet group withdrew due to inadequate control of symptoms. A further person withdrew in the gluten-free group due to an acute psychiatric illness. It is important to point out that all individuals enrolled in this RCT had already responded to a gluten-free diet prior to study entry, so the efficacy of instituting a gluten-free diet anew in patients with IBS remains uncertain.

[36] [37] Both RCTs ensured that the people with IBS who were included did not have coeliac disease, either by performing serological testing or by performing small intestinal biopsy. No data were reported on adverse effects from the

first study. [36] The other RCT reported that there were no adverse effects of the interventions or treatments in the entire study. [37]

Comment:

We found a third RCT (40 people) that compared a high-gluten diet (16 g/day wholewheat incorporated into diet) with a low-gluten diet (2 g wholewheat incorporated into diet) and with placebo (gluten-free diet) in people with IBS already on gluten-free diet. [38] This RCT was a crossover study. There was a run-in period in which all participants were educated on a diet low in fermentable, oligo-, di-, monosaccharides, and polyols (FODMAPs). They were continued on a gluten-free diet and low-FODMAP diet throughout and were randomised to high-gluten, low-gluten, or placebo for 1 week followed by a washout period before crossing over to the next diet. The RCT found that, overall, symptoms and pain significantly worsened irrespective of the diet, with bloating and tiredness being significantly worse in the low-gluten and placebo arms. However, there was an overall improvement in symptoms across all groups during the FODMAP run-in period (see also option on Low-FODMAP diet, p 8).

This RCT also describes a 3-day re-challenge trial (22 people) where all participants were given a background diet that was gluten-free, low in FODMAPs, dairy free, and low in naturally occurring and artificially added food chemicals. Participants were again randomised to high gluten, low gluten, and placebo. There were no differences across the groups for change in overall symptoms compared with the average during the baseline period.

Clinical guide

Food intake is often a precipitant of symptoms in IBS. Many people with IBS believe they are intolerant of, or allergic to, certain foods; although, often this is not able to be reproduced on a blinded re-challenge with the offending foodstuff. [39] Despite this, people with IBS often institute dietary changes themselves, in an attempt to alleviate symptoms. While the data from these RCTs are interesting, they should be regarded as preliminary only, as the studies themselves are small and the observed effects are inconsistent. Ideally, larger RCTs are required, although conducting dietary intervention trials in large numbers of people is difficult. Nevertheless, for people who feel that their symptoms are worse with gluten-containing foods, a trial of a gluten-free diet is not unreasonable; particularly for a patient who is keen to avoid drugs and their potential side effects. This would need the involvement of a trained registered dietitian. The data from one of the RCTs [36] would suggest that people with IBS in whom pain or bloating is the predominant symptom may derive the most benefit.

OPTION DIET LOW IN FERMENTABLE OLIGOSACCHARIDES, DISACCHARIDES, MONOSACCHARIDES, AND POLYOLS (FODMAPS) New

- For GRADE evaluation of interventions for Irritable bowel syndrome: dietary interventions, see table, p 13 .
- We don't know if a low-FODMAP diet is more effective than a normal diet in controlling symptoms in IBS, as there was only one RCT providing evidence of low quality for a clinically significant benefit.
- However, adverse events are unlikely in the short-term, and for people who are keen to avoid pharmacological therapies due to concerns about side effects (particularly those in whom pain or bloating is the predominant symptom), a trial of a low-FODMAP diet may be worthwhile.

Benefits and harms

Low-FODMAP diet versus normal diet:

We found one RCT that met our inclusion criteria. This RCT was a crossover trial comparing a diet low in FODMAPs with a normal Australian diet in patients with IBS over a 21-day period. [40] This trial also compared the two dietary interventions in a population of healthy people, but we have not reported these results here. [40]

Symptom improvement

Low-FODMAP diet compared with normal diet A diet low in FODMAPs may be more effective at improving gastrointestinal symptoms (including abdominal pain, bloating, dissatisfaction with stool consistency) in people with IBS compared with a normal diet, but the evidence is limited to one study with imprecise results due to small numbers and indirectness for the intervention (artificial situation in trial) (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Symptom improvement					
[40] RCT **Crossover design**	33 people with IBS fulfilling Rome III criteria (see table 2, p 13); a separate group of 12 healthy people were also randomised	**Overall GI symptoms (100-mm visual analogue scale [VAS]) , averaged over the last 14 days of each of the interventional dietary periods** 22.8 with low-FODMAP diet 44.9 with normal diet Differences of 10 mm or more were arbitrarily considered clinically significant 30 people in this analysis	P <0.001		low-FODMAP diet
[40] RCT **Crossover design**	33 people with IBS fulfilling Rome III criteria; a separate group of 12 healthy people were also randomised	**Abdominal pain (100-mm VAS) , averaged over the last 14 days of each of the interventional dietary periods** 22.5 with low-FODMAP diet 43.8 with normal diet Differences of 10 mm or more were arbitrarily considered clinically significant 30 people in this analysis	P <0.001	○○○	low-FODMAP diet
[40] RCT **Crossover design**	33 people with IBS fulfilling Rome III criteria; a separate group of 12 healthy people were also randomised	**Bloating (100-mm VAS) , averaged over the last 14 days of each of the interventional dietary periods** 24.2 with low-FODMAP diet 45.1 with normal diet Differences of 10 mm or more were arbitrarily considered clinically significant 30 people in this analysis	P <0.001	○○○	low-FODMAP diet
[40] RCT **Crossover design**	33 people with IBS fulfilling Rome III criteria; a separate group of 12 healthy people were also randomised	**Dissatisfaction with stool consistency (100-mm VAS) , averaged over the last 14 days of each of the interventional dietary periods** 25.9 with low-FODMAP diet 47.8 with normal diet Differences of 10 mm or more were arbitrarily considered clinically significant 30 people in this analysis	P <0.001	○○○	low-FODMAP diet

Quality of life

No data from the following reference on this outcome. [40]

Adverse effects

No data from the following reference on this outcome. [40]

Low-FODMAP diet versus standard usual care:

We found no systematic reviews or RCTs.

Further information on studies

[40] The RCT was a crossover study. Baseline dietary data were collected for one usual week for all participants, who were then randomised into one of two groups. One group received a diet low in FODMAPs (aiming for <0.5 g of FODMAPs per meal), and the other group received an Australian diet (designed to represent a typical amount of FODMAPs in a normal diet). The intervention period lasted 21 days before crossover, which was followed by a wash-out period of at least a further 21 days when the participant's usual diet was resumed. The second intervention diet period of 21 days was begun only after symptoms had returned to the same level as the baseline period. Other than daily symptom scores, the study also assessed frequency, weight, water content, and King's Stool Chart ratings on collected stool samples. We have not reported on these stool assessments. Data were also collected on eight healthy control participants who had minimal symptoms that were not found to be affected by either dietary intervention. Patients with coeliac disease, previous abdominal surgery, and comorbid conditions (e.g., diabetes) were excluded, as well as patients who had previously seen a dietitian for management of IBS or who were at the time taking any medications for IBS.

Comment:

We also found a further RCT (15 people with IBS fulfilling the Rome III criteria), comparing a low-FODMAP diet with a high-FODMAP diet for 2 days in people with IBS. [41] This trial also compared the two dietary interventions in a population of 15 healthy people. It did not meet our inclusion criteria, but we have commented on it here. The RCT was a crossover study that did not distinguish between the pre-crossover data and post-crossover data, although there was a 7-day washout period before the crossover. People were randomised to either a low-FODMAP (9 g FODMAPs per day) or a high-FODMAP (50 g FODMAPs per day) diet. Actual dietary intake was assessed from food diaries. The main aim of the study was to compare the patterns of breath hydrogen and methane production and IBS symptoms with the two diets; no association was found. It reported a median composite IBS abdominal symptom score using the Likert scale (0 = none to 9 = severe) of 2 with a low-FODMAP diet and 6 with a high-FODMAP diet (P = 0.002). A limitation of this study is the 50 g FODMAP intake per day, which does not represent a normal diet, and the 2-day diet, which is considered of little relevance for informing patients about the effects.

Clinical guide

Concerning the potential beneficial effects of low FODMAP, gastroenterologists are generally enthusiastic about its role in treatment of IBS, despite the absence of high-quality evidence to demonstrate a benefit for patients. We do, however, believe that the risks and potential adverse events of such a diet in the short-term are minimal, although the effects on nutritional status and general health in the longer term remain uncertain. What becomes important for decision-making is burden of treatment and practical consequences. Patients need to be willing to accept the additional burden of adjusting their diet to one that is low in FODMAP-containing foods. It is likely that those individuals who have reported symptoms of IBS to be associated with foodstuffs containing FODMAPs will be most motivated to try a low-FODMAP diet, and may also be more likely to experience the beneficial effects, including placebo effects, of such a diet.

GLOSSARY

Very low-quality evidence Any estimate of effect is very uncertain.

Visual Analogue Scale (VAS) A commonly used scale in pain assessment. It is a 10-cm horizontal or vertical line with word anchors at each end, such as 'no pain' and 'pain as bad as it could be'. The person is asked to make a mark on the line to represent pain intensity. This mark is converted to distance in either centimetres or millimetres from the 'no pain' anchor to give a pain score that can range from 0–10 cm or 0–100 mm.

SUBSTANTIVE CHANGES

Gluten-free diet New option. Two RCTs added. [36] [37] Categorised as 'unknown effectiveness'.

Diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) New option. One RCT added. [40] Categorised as 'unknown effectiveness'.

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Disclaimer

TABLE 1 Manning criteria [1]

Recurrent abdominal pain and 2 or more of the following:

- Relief of pain with defecation
- More frequent stools at the onset of pain
- Looser stools at the onset of pain
- Visible abdominal distension
- Passage of mucus per rectum
- A sensation of incomplete evacuation

TABLE 2 Rome III criteria [2]

Recurrent abdominal pain or discomfort at least 3 days a month in the past 3 months, with symptom onset at least 6 months before diagnosis, associated with 2 or more of the following:

- Improvement with defecation
- Onset associated with a change in frequency of stool
- Onset associated with a change in form (appearance) of stool

GRADE Evaluation of interventions for Irritable bowel syndrome: dietary interventions.

Important outcomes			Quality of life, Symptom improvement						
Studies (Participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
What are the effects of dietary modification (gluten-free diet; a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols [FODMAPs]) in people with irritable bowel syndrome?									
2 (84) [36] [37]	Symptom improvement	Gluten-free diet versus normal diet or general dietary advice	4	–2	–1	0	0	Very low	Quality points deducted for sparse data and incomplete reporting of results; consistency point deducted as effect varied with symptom measured and at different time points
1 (30) [40]	Symptom improvement	Low-FODMAP diet versus normal diet	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and for not being able to differentiate pre-crossover and post-crossover results; directness point deducted for artificial situation in trial

We initially allocate 4 points to evidence from RCTs, and 2 points to evidence from observational studies. To attain the final GRADE score for a given comparison, points are deducted or added from this initial score based on preset criteria relating to the categories of quality, directness, consistency, and effect size. Quality: based on issues affecting methodological rigour (e.g., incomplete reporting of results, quasi-randomisation, sparse data [<200 people in the analysis]). Consistency: based on similarity of results across studies. Directness: based on generalisability of population or outcomes. Effect size: based on magnitude of effect as measured by statistics such as relative risk, odds ratio, or hazard ratio.