

IBS and the Low ▶ FODMAP Diet

Fall Research Review

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Why we need to know more?

- ▶ Trending topic!
 - ▶ FNCE 2019- Emerging Integrative Approaches for Nutrition and Dietetics Practice
- ▶ Affects 10-20% of the population
- ▶ More research available



Outline

- ▶ Introduction to IBS
 - ▶ Diagnosis
 - ▶ Signs & Symptoms
 - ▶ NCP of IBS
- ▶ Diet Intervention with Low FODMAP Diet
- ▶ Phases of low FODMAP diet
- ▶ Research study #1
- ▶ Research study #2
- ▶ Research study #3
- ▶ “Take home”
- ▶ References

What is IBS?



Functional GI disorder → involves disturbances of the brain-gut axis

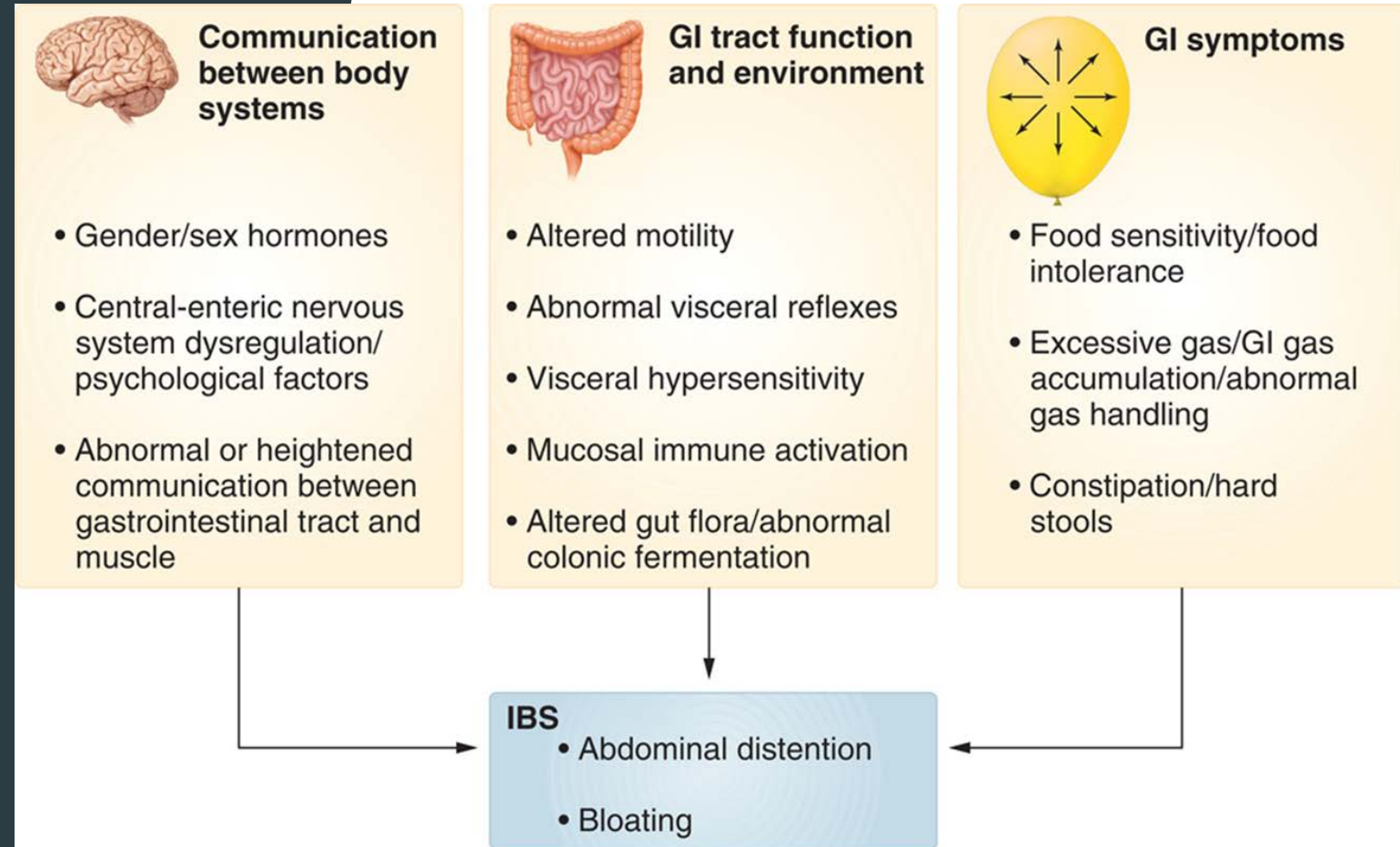
- Abnormal serotonin levels over stimulate muscle of the bowl and cause discomfort

Characterized by chronically recurring abdominal discomfort or pain and altered bowel habits

- Other common symptoms include bloating, feelings of incomplete evacuation, presence of mucus in the stool, straining or increased urgency and increased GI distress

Symptoms first occur between adolescence and 40 years of age

Potential Etiological Factors in IBS



Source: © Cengage Learning.

Irritable Bowel Syndrome (IBS)



Diagnosis

- ▶ Symptoms of abdominal discomfort must include **at least 3 months** of continuous or recurrent symptoms of abdominal pain or discomfort relieved with defecation or associated with change in frequency or consistency of stool.
- ▶ **Characterized into 3-subtypes**
 - ▶ Diarrhea predominant (IBS-D)
 - ▶ Constipation predominant (IBS-C)
 - ▶ Alternating bowel habits (IBS-A)

Irritable Bowel Syndrome (IBS)

Signs and Symptoms:

- ▶ Anemia, fever, persistent diarrhea, rectal bleeding, weight loss and nocturnal symptoms
- ▶ Family hx
- ▶ Food allergies or lactose maldigestion

▶ Factors that worsen (besides stress and dietary pattern)

- ▶ Excessive use of laxatives
- ▶ Antibiotics
- ▶ Caffeine
- ▶ Previous GI illness
- ▶ Lack of regular sleep
- ▶ Fluid intake

NCP: Irritable Bowel Syndrome

Assessment

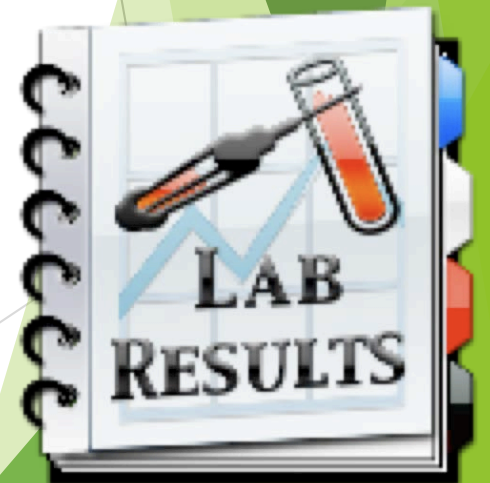
- ▶ Diet hx & Family hx of GI disorders
- ▶ Recurrent abdominal pain or discomfort
- ▶ Change in frequency or form of stool
- ▶ Other symptoms: belching, flatulence, heartburn, nausea, urgency for defecation

Procedures

- ▶ Lower GI x-rays, colonoscopy, or sigmoidoscopy

Biochemical

- ▶ r/o celiac disease (tTG), hydrogen breath test for lactose intolerance
- ▶ CPR, Iron, Albumin, Glucose, Hgb & Hct, Na, K, Ca, Mg, Serum Vit D3



NCP: Irritable Bowel Syndrome

Intervention

- ▶ Individualize diet to patient's symptoms
- ▶ Encourage regular eating patterns, adequate rest, and good bowel hygiene
- ▶ Increase physical activity
- ▶ Consume adequate fluids
- ▶ Monitor possible intolerances to gluten
- ▶ Limit foods high in FODMAPS
- ▶ Identify added food chemicals as possible offending agents (lactose, caffeine)



NCP: Irritable Bowel Syndrome

Food & Nutrition

- ▶ Avoid high sugar and fat intake
- ▶ Increase soluble fiber and fluid intake
- ▶ Exclusion or stepwise reintroduction diets may be useful
 - ▶ Lactose free
 - ▶ Gluten Free
 - ▶ Low FODMAP

Nutrition Education & Counseling

- ▶ IBS is not harming intestines nor leads to cancer
- ▶ Hydration!
- ▶ Plan out regular bowel movements
- ▶ Smaller more frequent meals for toleration of symptoms
- ▶ Stress management
- ▶ Regular exercise



Fermentable	Gut bacteria can ferment food components when eaten in large portions. This can result in bloating, gas, abdominal pain, and diarrhea.
Oligosaccharides	<u>Fructan sources:</u> Wheat, rye, garlic, onion, leeks, and artichokes <u>Galacto-oligosaccharides (GOS) sources:</u> Beans, lentils, soybeans, and nuts, including cashews
Disaccharides	<u>Lactose sources:</u> Dairy products and ingredients from cow, goat, or sheep's milk
Monosaccharides	<u>Fructose sources:</u> Certain fruits, honey, and high-fructose corn syrup
AND	--
Polyols	<u>Sources:</u> sorbitol, mannitol, maltitol, erythritol, xylitol, and isomalt, apricots, avocados, cherries, nectarines, peaches, and plums and mushrooms

Diet Intervention - Low FODMAP

Why is this diet used -or- who would benefit from it?

- ▶ Prescribed to reduce symptoms
 - ▶ IBS and IBD



- ▶ **Symptoms include:**
 - ▶ Diarrhea or constipation
 - ▶ Weight loss
 - ▶ Fever
 - ▶ Nausea and vomiting
 - ▶ food intolerances
 - ▶ Malnutrition
 - ▶ Adnominal pain
 - ▶ Gas
 - ▶ Bloating

3 Phases of the Low FODMAP Diet

1. Elimination

- 2-6 weeks
- Goal: Remove high FODMAP foods for symptom resolution

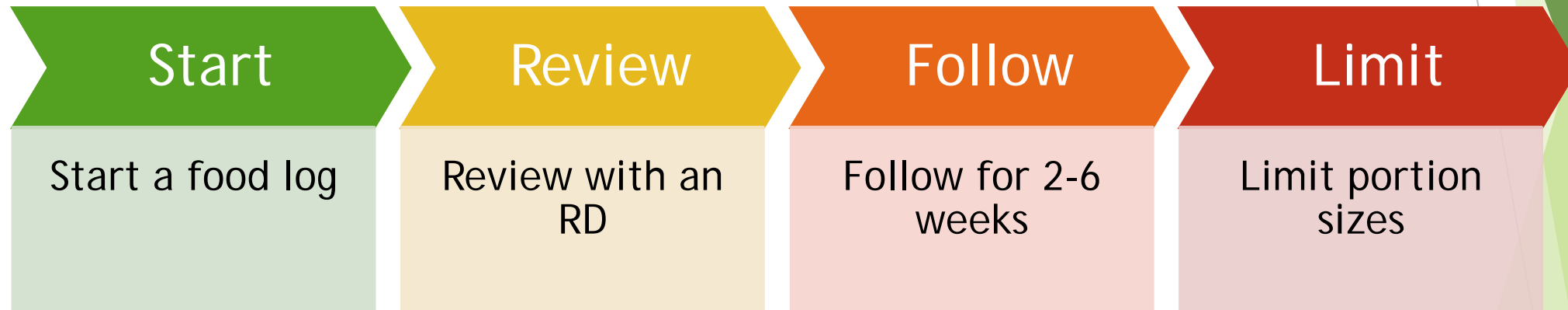
2. Determine Sensitivities / Reintroduction

- 6-8 weeks
- Goal: Addition of food types back into diet to identify trigger foods

3. Personalize

- As needed for symptom management
- Goal: Successful introduction of FODMAP foods to expand diet to personalize tolerance.

Phase 1- Elimination



Elimination Phase review with the RD

Instruct on

Instruct on low FODMAP foods and resources

Identify

Identify favorite foods and provide substitutes

Encourage

Encourage patient/client

Give

Give details/instruction on following low FODMAP diet

Phase 2- Determine Sensitivities / Reintroduction

- ▶ After Phase 1 of eliminating foods high in FODMAPs, begin reintroducing foods back into diet
- ▶ 6-8 weeks
- ▶ Add one high FODMAP food at a time
 - ▶ Keep a detailed food log & symptoms tracker
- ▶ **Each day, record:**
 - ▶ Food and beverage intake
 - ▶ How much?
 - ▶ Your symptom type, severity, and onset of that symptom

Phase 3- Personalize



AFTER IDENTIFYING SYMPTOMATIC
FOODS, ONE SHOULD BE ABLE TO
PERSONALIZE THEIR DIET



ELIMINATE THE FODMAPS THAT
CAUSE SYMPTOMS



KEEP THE GOOD!

Research Study #1

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

Böhn, Lena et al. Diet Low in FODMAPs Reduces Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial (2015). *Gastroenterology*, 149 (6), pp. 1399-1407.e2.

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

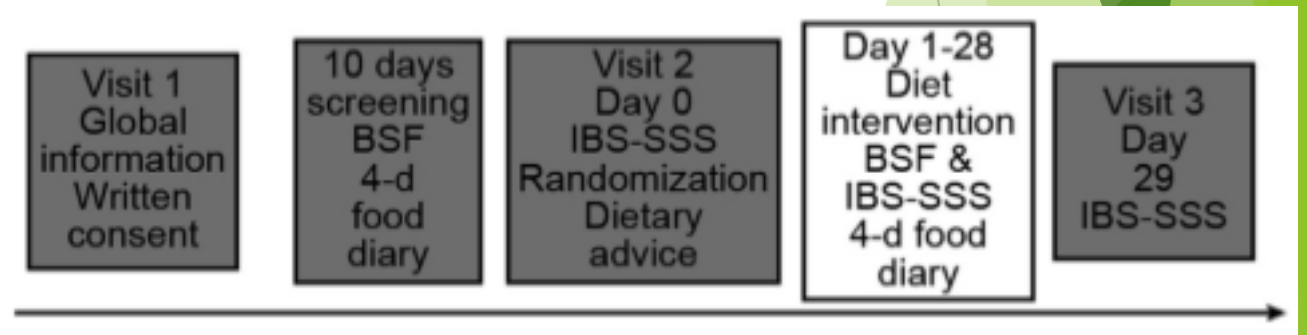
- ▶ **Purpose:** To compare a diet low in FODMAPs with traditional dietary advice
- ▶ **Design:** Randomized control trial (multicenter, parallel, single-blind study)
- ▶ **Location:** Gastroenterology outpatient clinics in Sweden
- ▶ **Participants:** 67

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

- ▶ **Inclusion:** all patients who met Rome-III criteria for IBS were enrolled
- ▶ **Exclusion:** Presence of a server cardiac, liver, neurologic, or psychiatric disease or a GI disease other than IBS (eg. IDB, celiac disease)
- ▶ Or patients following an exclusion diet prior to the study (eg, low in FODMAPS, GF, vegan)

▶ **Methods:**

- ▶ Visit 1: Screening
- ▶ Visit 2 (Day 0): Randomization
- ▶ Visit 3 (Day 29): End of treatment period



Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

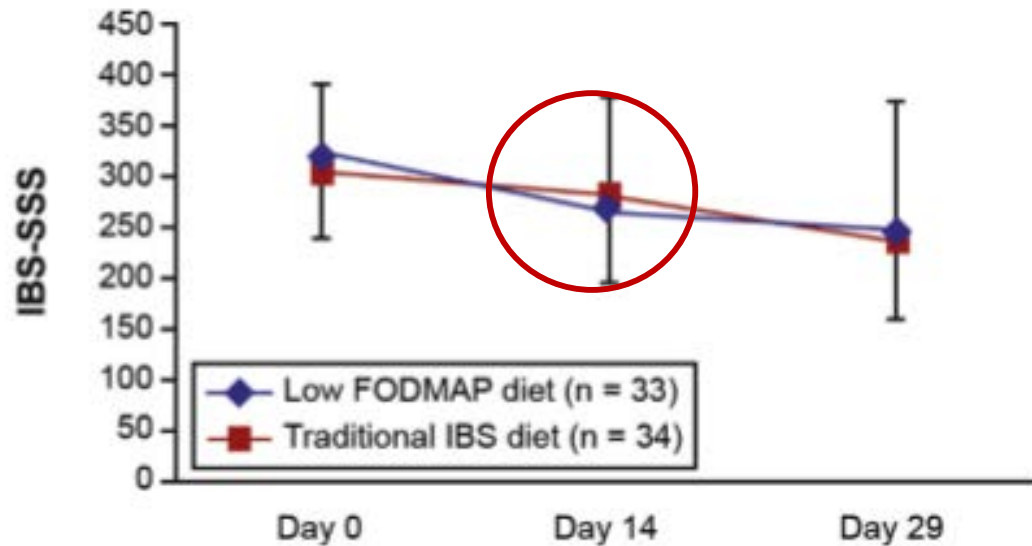
Intervention

- ▶ Randomized assignment to specific diet
 - ▶ (Diet A) low FODMAP
 - ▶ (Diet B) The traditional IBS diet
- ▶ Symptom Assessments
 - ▶ IBS-SSS Questionnaires → day 0,14, 29
 - ▶ Stool diary → everyday
 - ▶ 4-day food diary
 - ▶ During screening period
 - ▶ Last week of intervention

Diet B

Diet A

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial



Results:

- ▶ Low FODMAP group at day 14 P= .002
- ▶ Traditional diet group at day 14 P= .051
- ▶ End of intervention period P < .001 in both groups
- ▶ IBS symptoms reduced in both groups at the end of the intervention phase compared to baseline.

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

Results:

- ▶ Total IBS-SSS scores show symptom improvement from baseline to the end of the intervention phase

Table 2. Irritable Bowel Syndrome Symptoms Symptom Severity Score and Bowel Habit (Bristol Stool Form scale) in the Intervention Groups

	Low-FODMAP diet			Traditional IBS diet			P value between intervention groups ^a
	Baseline (n = 33), mean ± SD	Intervention (n = 33), mean ± SD	P value within group ^a	Baseline (n = 34), mean ± SD	Intervention (n = 34), mean ± SD	P value within group ^a	
IBS-SSS total score	324 ± 69	246 ± 127	<i><.001</i>	302 ± 61	236 ± 78	<i><.001</i>	.62
Abdominal pain intensity	51.8 ± 23.8	42.2 ± 32.6	.07	46.9 ± 23.0	37.6 ± 26.9	.06	.53
Abdominal pain frequency	57.6 ± 31.4	43.6 ± 30.6	.008	60.6 ± 28.6	37.8 ± 26.5	<i><.001</i>	.33
Abdominal distension	68.7 ± 21.6	45.8 ± 32.8	<i><.001</i>	62.4 ± 26.2	50.0 ± 31.5	.003	.60
Dissatisfaction of bowel habit	65.9 ± 25.5	58.5 ± 31.2	.22	63.6 ± 21.5	53.4 ± 25.3	.01	.47
Interference on life in general	72.5 ± 20.7	55.9 ± 31.0	.001	69.9 ± 20.8	58.6 ± 24.3	.002	.69
Stool consistency	4.0 ± 1.1	3.9 ± 1.1	.12	3.8 ± 1.1	3.6 ± 1.0	.07	.28
Stool frequency	1.9 ± 0.8	1.5 ± 0.7	<i><.001</i>	1.6 ± 0.7	1.5 ± 0.6	.15	.64

NOTE. Significant differences are displayed in italic.

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

Results

- ▶ Diet adherence
- ▶ Unwanted result

Table 3. Dietary Intake in Patients on Low-FODMAP Diet and Patients on Traditional Irritable Bowel Syndrome Diet

	Low-FODMAP diet			Traditional IBS diet			P value between intervention groups ^a
	Baseline (n = 38), mean ± SD	Intervention (n = 33), mean ± SD	P value within group ^a	Screen (n = 37), mean ± SD	Intervention (n = 34), mean ± SD	P value within group ^a	
Energy, kcal	2100 ± 435	1658 ± 365	<.001	2085 ± 446	1889 ± 482	.009	.03
Protein, g	90.3 ± 36.6	75.2 ± 16.7	.001	85.3 ± 16.9	77.2 ± 21.9	.03	.67
Fat, g	89.1 ± 27.4	68.3 ± 25.5	<.001	90.4 ± 24.8	78.4 ± 24.7	.009	.11
Carbohydrates, g	205.0 ± 53.8	159.1 ± 40.6	<.001	200.2 ± 62.7	193.1 ± 57.8	.42	.007
Dietary fiber, g	18.2 ± 6.2	15.1 ± 5.6	.001	20.0 ± 7.9	20.2 ± 6.4	.99	.003
Alcohol, g	11.2 ± 11.0	9.7 ± 12.9	.05	11.6 ± 13.0	8.9 ± 11.1	.06	.005
Monosaccharides	29.4 ± 16.9	20.0 ± 10.5	.001	27.6 ± 45.5	28.3 ± 11.0	.97	.001
Fructose	14.9 ± 9.9	8.4 ± 4.9	<.001	13.8 ± 8.1	11.6 ± 4.9	.12	.009
Total FODMAPs, g	16.6 ± 10.3	3.8 ± 3.3	<.001	15.8 ± 8.4	13.5 ± 8.7	.16	.05
Excess fructose	2.0 ± 5.7	0.9 ± 3.1	.07	3.5 ± 7.2	0.5 ± 1.6	.83	.55
Lactose	10.0 ± 9.3	1.5 ± 1.7	<.001	8.3 ± 5.6	9.3 ± 8.5	.56	.002
GOS	0.4 ± 0.3	0.2 ± 0.2	.001	0.5 ± 0.4	0.4 ± 0.3	.06	<.001
Fructans	2.3 ± 1.0	1.0 ± 0.6	<.001	2.4 ± 1.1	2.3 ± 1.3	.77	<.001
Polyols	1.0 ± 1.5	0.1 ± 0.1	.001	1.1 ± 1.4	1.0 ± 1.1	.61	<.001
No. of meals/d	5.9 ± 1.1	5.5 ± 1.4	.002	5.5 ± 1.1	6.0 ± 0.9	.006	.05
Energy/meal, kcal	365 ± 84	321 ± 106	.01	389 ± 83	316 ± 71	<.001	.85
Dietary fiber/meal, g	3.2 ± 1.1	3.0 ± 1.3	.18	3.8 ± 1.7	3.4 ± 1.0	.14	.16

Diet Low in FODMAPs Reduce Symptoms of Irritable Bowel Syndrome as Well as Traditional Dietary Advice: A Randomized Controlled Trial

- ▶ **Conclusion:** The low FODMAP diet reduces IBS symptoms as well as traditional IBS dietary advice. A combination of these two diets may further reduce IBS symptoms.
 - ▶ Bloating, abdominal pain, and flatulence were the symptoms with the greatest symptom improvement
- ▶ **Lesson:** Calorie and nutrient intakes need to be supervised in order to avoid malnutrition if long-term dietary changes are initiated
- ▶ **Strengths:** Single-blinded and free of bias
- ▶ **Limitations:** Food diaries- risk of underestimation of actual intake
- ▶ **I rated this article:** Positive (+)

Research Study #2

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study

de Roest RH, Dobbs BR, Chapman BA, et al. The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study. *Int J Clin Pract.* 2013;67(9):895-903.

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study

- ▶ **Purpose:** To determine whether the low FODMAP diet improves gastrointestinal symptoms in patients with IBS?
- ▶ **Design:** Prospective observational study
- ▶ **Location:** Department of Medicine, University of Otago, Christchurch, New Zealand
- ▶ **Final n:** 90 participants

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study

Methods

- ▶ Patients/Participants
- ▶ Breath Testing
- ▶ Dietary Advice
 - ▶ 1-hr initial consultation 6-day food log prior to consultation
 - ▶ Education and counseling on low FODMAP diet
 - ▶ 30 min follow up 6 weeks later.
- ▶ Patient Assessments
 - ▶ Assessed safety, adherence, and efficacy
 - ▶ Questionnaires → Bowel habits & Symptoms

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome

- ▶ **Inclusion:** Patients who were referred for hydrogen/methane breath testing for fructose and lactose malabsorption and dietary consultation with experienced dietitians.
- ▶ **Exclusion:** Significant GI comorbidities, such as inflammatory bowel disease, significant diverticular disease or a past history of bowel resection.
- ▶ **Interventions**
 - ▶ RDs instructed patients on the low FODMAP diet
 - ▶ Participants used a food log/symptom tracker (6 days) prior to consultation.
 - ▶ Participants answer two questionnaire for both an initial questionnaire and the follow up with the same questions, with the addition of adherence and opinion about the diet & degree of symptom change.

Table 2 Symptom severity scores at baseline and follow up using the gastrointestinal symptom rating scale (mean follow up 15.7 months)

Bowel symptom	n	Baseline	Follow-up	p (two-tailed)*	p (two-tailed) assuming non-repliers did not change symptoms**
		median (25–75%)	median (25–75%)		
Abdominal pain	72	4 (2–5)	90 2 (1–3)	.000	.000

Bowel symptom	n	Baseline median (25–75%)	n	Follow-up median (25–75%)	p (two-tailed)*
Abdominal pain	72	4 (2–5)	90	2 (1–3)	.000
Bloating	89	4 (2–5)	90	2 (1–4)	.000
Constipation	89	2 (1–4)	90	1 (1–2)	.003
Diarrhoea	88	2 (1–4)	90	1 (1–2)	.000
Nausea	89	2 (1–3)	90	1 (1–2)	.000
Passing gas	90	4 (2–5)	90	2 (2–4)	.000
Abdominal pain/discomfort relieved by bowel movement	88	1 (1–2)	90	1 (1–2)	.000
Feeling full shortly after having started a meal	88	2 (1–4)	90	1 (1–2)	.001
Feeling full even long after you stopped eating	90	1 (1–4)	90	1 (1–2)	.051
Visible swelling abdomen	89	3 (1–5)	90	2 (1–3)	.000
Passage of mucus	89	1 (1–1)	90	1 (1–2)	.890
Indigestion	88	1.5 (1–3)	90	1 (1–2)	.015

*Wilcoxon signed-rank test performed on the baseline and follow-up scores of repliers.

**Wilcoxon signed-rank test performed on all patients, assuming that the non-repliers had no improvement in Likert scale from baseline.

Higher symptom scores reflect more severe symptoms.

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study

RESULTS

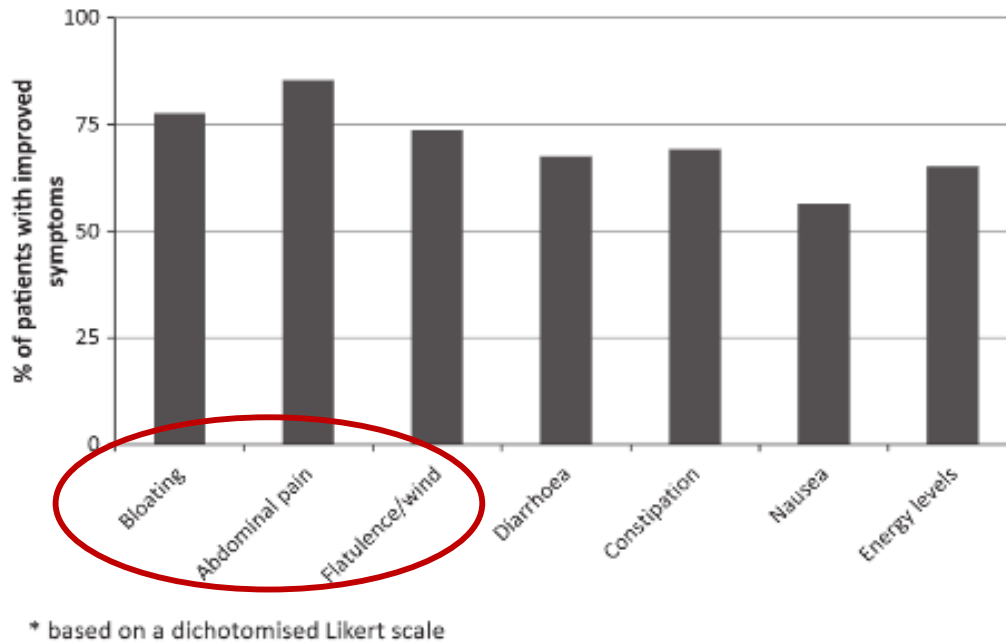


Figure 1 Percentage of patients that report self-experienced improvement (based on a dichotomised Likert scale)

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study

RESULTS

The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel

- ▶ **Conclusion:** The low FODMAP diet shows efficacy for IBS patients. The strategy of breath testing and dietary advice provides a good basis to understand and adhere to the diet.
- ▶ **Strength:** First prospective study to confirm the efficacy of the low FODMAP diet for patients with IBS
- ▶ **Limitations:** The response rate of 46.9% was lower than hoped
- ▶ **Rated this article:** Positive (+)

Research Study #3

The Impact of a 4-week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea

Eswaran, S., Dolan, R. D., Ball, S. C., Jackson, K., & Chey, W. (2019). The Impact of a 4-Week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea. *Journal of the Academy of Nutrition and Dietetics*, 0(0). doi: 10.1016/j.jand.2019.03.003

The Impact of a 4-week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea

▶ Purpose

- ▶ To determine changes in the mean reported daily nutrient content before and after 4-weeks of a **low-FODMAP diet vs modified National Institute for Health and Clinical Excellence (mNICE)** dietary intervention
- ▶ Identify nutritional inadequacies based on comparison to the Dietary Reference Intakes in patients with IBS-D.
- ▶ **Design:** Post hoc analysis of a randomized controlled trial entailing a 4-week trial period comparing low-FODMAP and mNICE diets.
- ▶ **Location:** Gastroenterology and primary care clinics at the University of Michigan Medical Center
- ▶ **Participants:** 78

The Impact of a 4-week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea

- ▶ **Inclusion:** symptoms compatible with IBS-D by the Rome III criteria, and a willingness to maintain a stable dose of antidepressants during the study
- ▶ **Exclusion:** IBS with mixed or constipated subtype, comorbid medical problems influencing gastrointestinal motility, IBD, severe renal disease, previous abdominal surgery (with exclusions), and previous treatment with a low-FODMAP diet
 - ▶ Pregnant patients and those taking probiotics, antibiotics, or narcotics were also excluded.

The Impact of a 4-week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea

Methods

- ▶ Eligible participants were screened
- ▶ Low-FODMAP diet (Diet 10): participants were instructed to decrease intake of FODMAPs
- ▶ mNICE diet (Diet 2): participants were instructed to eat small frequent meals, avoid trigger foods, and avoid excess alcohol and caffeine

Intervention

- ▶ 3-day food log before and during final week
- ▶ Additional food record at week 2
- ▶ Met with RD before final week

Average daily nutrient intake before and after 4-week low-FODMAP (n=41) and mNICE (n= 37) diets in 78 US adults with IBS-D, participating in a randomized controlled trial

Results

Significant reduction in:

- ▶ Thiamin
- ▶ Riboflavin
- ▶ Calcium
- ▶ Sodium

No micronutrient reduction in mNICE group

Parameter	Low-FODMAP Diet			mNICE Diet		
	Average baseline value	Average Week 4 value	Difference	Average baseline value	Average Week 4 value	Difference
	←—mean±standard deviation—→			←—mean±standard deviation—→		
Energy (kcal) ^d	2,043±653	1,691.0±601.0	351.6**	2,005.0±511.0	1,691.0±601.0	169.5**
No. of daily meals ^d	5.48±1.7	4.9±1.5	0.57**	5.49±1.7	4.80±1.4	0.68**
Protein ^d (g)	77.6±28.7	72.7±36.7	4.95	74.5±22.5	77.3±36.1	2.8
Fat ^d (g)	80.9±32.5	75.1±37.9	5.84	80.4±25.2	69.9±36.3	10.5**
Saturated fat (g)	27.4±13.1	23.5±11.1	3.87	26.0±9.3	22.1±13.0	3.8**

Parameter	Low-FODMAP Diet			mNICE Diet		
	Average baseline value	Average Week 4 value	Difference	Average baseline value	Average Week 4 value	Difference
Thiamin (mg)	1.6±0.6	1.3±0.6	-0.35**	1.8±0.6	1.6±0.8	-0.16
Riboflavin (mg)	2.0±0.8	1.7±0.6	-0.3*	1.9±0.6	1.8±0.8	-0.14
Calcium (mg)	969.5±423.0	752.3±300.0	-217.2**	961.4±375.8	855.1±408.3	-106.3
Sodium (g)	3.4±1.5	2.4±0.9	-1.0***	3.3±0.9	3.3±1.5	-0.14
Folate (μg)	380.6±126.0	338.8±182.9	-41.7	411.4±149.8	388.9±266.3	-22.52
Vitamin B-12 (μg)	4.0±2.8	3.5±1.6	-0.5	3.56±1.9	3.57±2.6	0.01
Pantothenic acid (mg)	5.3±1.8	5.1±2.4	-0.2	5.7±2.4	5.9±4.0	0.14
▶ Calcium (mg)	969.5±423.0	752.3±300.0	-217.2**	961.4±375.8	855.1±408.3	-106.3
Copper (μg)	1.2±0.5	1.3±1.1	0.04	1.2±0.4	1.2±0.5	0
Iron (mg)	13.8±5.1	11.8±5.4	-2.0	14.9±6.2	14.4±8.9	-0.44
Magnesium (mg)	310.5±99	321.4±136	10.9	306.4±109.1	298.1±135.8	-8.4
Manganese (mg)	3.8±1.4	3.8±1.6	0	3.6±1.6	3.6±2.2	0
Phosphorus (mg)	1,246.0±435.0	1,116.0±365.0	-130.1	1,202±322.0	1,186.0±510.0	-15.8
Selenium (μg)	108.4±48.7	92.0±44.8	-16.4	111.5±33.8	105.6±47.3	-5.9
Zinc (mg)	10.1±3.8	10.0±3.9	-0.12	9.49±3.4	10.1±5.5	0.61
Potassium (g)	2,413.0±815.0	2,386.0±860.0	-26.9	2,333.0±731.0	2,388.0±899.0	55.5
▶ Sodium (g)	3.4±1.5	2.4±0.9	-1.0***	3.3±0.9	3.2±1.3	-0.14

Average calorie-adjusted daily nutrient intake before and after 4-weeks low-FODMAP (n=41) and mNICE (n=37) diets in 78 adults with IBS-D, participating in a randomized controlled trial

Results

After dietary consult with RD to address deficiencies:

- ▶ Decrease in riboflavin
- ▶ Increase in niacin and vitamin B6
- ▶ No decrease in micronutrient intake in mNICE cohort

Parameter	Low-FODMAP Diet			mNICE Diet		
	Calorie-adjusted baseline value	Calorie-adjusted Week 4 value	Difference	Calorie-adjusted baseline value	Calorie-adjusted Week 4 value	Difference
	←—mean±standard deviation—→			←—mean±standard deviation—→		
Protein (g)	46±22.6	43.0±11.8	-3	37.4±17.9	41.7±12.4	4.3
Fat (g)	49.3±31.1	43.0±9.3	-6.3	40.1±17.8	37.3±8.8	-2.8
Saturated fat (g)	17.0±12.9	13.5±3.7	-3.5	12.9±6.3	11.7±4.1	-1.2
Carbohydrates (g)	141.7±63	110.1±25.8	-31.6**	120.4±50.6	122.5±29.6	2.1
Fiber (g)	10.7±5.1	11.0±4.2	0.27	9.2±4.6	10.3±3.5	1.1

Parameter	Low-FODMAP Diet			mNICE Diet		
	Calorie-Adjusted baseline value	Calorie-Adjusted Week 4 value	Difference	Calorie-Adjusted baseline value	Calorie-Adjusted Week 4 value	Difference
Riboflavin (mg)	1.2±0.6	1±0.3	-0.2*	0.98±0.48	0.99±0.25	0.01
Thiamin (mg)	1±0.5	0.8±0.7	0.1	0.91±0.47	0.88±0.24	-0.03
Riboflavin (mg)	1.2±0.6	1±0.3	-0.2*	0.98±0.48	0.99±0.25	0.01
Niacin (mg)	13.3±6.0	14±5	0.7*	12.3±5.6	14.4±9.8	2.2
Vitamin B-6 (mg)	1±0.4	1.3±0.7	0.3**	0.9±0.42	1.2±0.84	0.26
Folate (µg)	225.9±108.6	211.9±120.4	-14.0	205.9±103.5	207.1±81.1	1.19
Vitamin B-12 (µg)	2.4±1.7	2.2±1.2	-0.2	1.78±1.1	1.86±0.97	0.08
Pantothenic acid (mg)	3.2±1.6	3.1±1.2	0.07	2.9±1.5	3.7±4	0.79
Calcium (mg)	601.6±399.2	475.3±214.2	-126.3	477.6±243.0	478.1±197.7	0.49
Copper (µg)	725.6±383.1	743.9±340.1	18.3	585.7±314.1	649±230.6	63.3
Iron (mg)	8.0±3.6	7.2±3.0	-0.8	7.5±4.3	7.6±2.9	0.13
Magnesium (mg)	183.3±86.6	196.8±66.2	13.5	152.8±73.8	165.7±61.3	12.9
Manganese (mg)	2.3±1.3	2.3±0.8	0	1.8±1.2	1.9±0.83	0.10
Phosphorus (mg)	743.8±376	675±126.8	-68.8	608.2±290.7	646.3±180.4	38.1
Selenium (µg)	65.1±37.2	54.2±15.1	-10.9	56.5±29	57.0±13.2	0.57
Zinc (mg)	6.0±2.9	6.0±1.6	0	4.8±2.5	5.3±1.8	0.57
Potassium (g)	1.4±0.7	1.5±0.5	0.1	1.2±0.5	1.3±0.35	0.19*
Sodium (g)	2.0±1.0	1.5±0.4	-0.5**	1.7±0.75	1.8±0.38	0.08

Results

In comparing both groups pre and post intervention:
(statistically significant)

- ▶ Fewer number of low FODMAP group members met DRIs for thiamin and iron
- ▶ Fewer number of mNICE group members met DRIs for calcium and copper

Observation

- ▶ Both diets had a decrease in calories consumed and number of daily meals



The Impact of a 4-week Low-FODMAP and mNICE Diet on Nutrient Intake in a Sample of US Adults with Irritable Bowel Syndrome with Diarrhea

- ▶ **Conclusion:** In this study, a decrease in mean intake of several micronutrients were observed with the implementation of the low FODMAP diet. Findings suggest that short-term use of elimination diet would not pose significant deficiencies and be safe to use.
- ▶ **Strength:** few trials have reported the intake of nutrients during this dietary intervention
- ▶ **Limitations**
 - ▶ Complete blinding was not possible
 - ▶ Bias may have been injected by RDs
 - ▶ RDs collecting and analyzing food diaries were aware of assigned intervention
 - ▶ Assessment of nutritional intake was in the form of food record analysis leaving room for error on in reported intake
- ▶ **Rated this article:** Neutral

Key “take away” points

My opinion of evidence results:

- ▶ Provides positive evidence
- ▶ Not for everyone
- ▶ RDN consults are crucial when implementing this diet
- ▶ Safe for short term use
 - ▶ Identify symptomatic food items
- ▶ Elimination diets such as the low FODMAP diet, may provide positive outcomes in symptom relief for individuals with IBS.

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Thank You!

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Q&A