The efficacy of a low-FODMAP diet in adult irritable bowel syndrome: a systematic review and meta-analysis

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Supplementary materials

Table S1 Sensitivity analysis for the primary analysis

Study out	Standardized mean difference	P value	LL	UL	 2	
Bohn (2015)	-0.71	0.001	-0.90	-0.52	32%	
Eswaran (2016)	-0.68	0.001	-0.92	-0.43	58%	
Halmos (2014)	-0.67	0.001	-0.91	-0.43	58%	
Harvie (2017)	-0.63	0.001	-0.86	-0.40	56%	
McIntosh (2017)	-0.64	0.001	-0.88	-0.41	57%	
Ong (2010)	-0.60	0.001	-0.81	-0.40	46%	
Paduano (2019)	-0.70	0.001	-0.93	-0.48	50%	
Patcharatrakul (2019)	-0.65	0.001	-0.89	-0.41	58%	
Pedersen (2014)	-0.63	0.001	-0.87	-0.40	56%	
Staudacher (2012)	-0.62	0.001	-0.85	-0.40	54%	
Staudacher (2017)	-0.67	0.001	-0.92	-0.43	58%	
Zahedi (2018)	-0.66	0.001	-0.90	-0.41	58%	

Abbreviations: LL, lower limit of 95% confidence interval; UL, upper limit of 95% confidence interval

Table S2 Sensitivity analysis for the secondary analysis

Study out	Mean difference	P value	LL	UL	 2	
Eswaran (2017)	3.87	0.02	0.71	7.03	21%	
Harvie (2017)	5.09	0.02	0.90	9.28	58%	
Paduano (2019)	6.39	0.004	2.00	10.77	58%	
Pedersen (2014)	5.08	0.02	0.85	9.30	58%	
Zahedi (2018)	6.99	0.001	3.39	10.58	18%	

Abbreviations: LL, lower limit of 95% confidence interval; UL, upper limit of 95% confidence interval

Table S3 Risk of bias table for included studies

Name of first author (year)	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting	Other bias
Bohn (2015)	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Eswaran (2016)	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Halmos (2014)	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Harvie (2017)	Low risk	Unclear risk	High risk	High risk	Low risk	Low risk	Low risk
McIntosh (2017)	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Ong (2010)	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Paduano (2019)	High risk	High risk	High risk	High risk	High risk	High risk	Low risk
Patcharatrakul (2019)	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Pedersen (2014)	Low risk	Unclear risk	High risk	High risk	Low risk	Low risk	Low risk
Staudacher (2012)	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Staudacher (2017)	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk
Zahedi (2018)	Low risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk

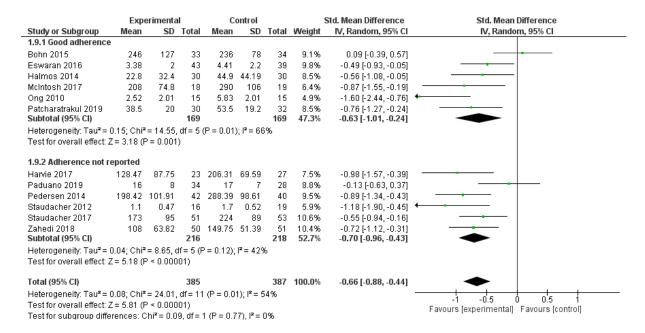


Fig. S1 Forest plot for subgroup analysis on adherence

	Е	xperimental			Control			Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
1.3.1 Below median									
Ong 2010	2.5163	2.0122	15	5.8279	2.0122	15	4.9%	-1.60 [-2.44, -0.76]	
Paduano 2019	16	8	34	17	7	28	8.8%	-0.13 [-0.63, 0.37]	
Pedersen 2014	198.42	101.91	42	288.39	98.61	40	9.5%	-0.89 [-1.34, -0.43]	
Staudacher 2012	1.1	0.47	16	1.7	0.52	19	5.9%	-1.18 [-1.90, -0.45]	(-
Staudacher 2017	173	95	51	224	89	53	10.6%	-0.55 [-0.94, -0.16]	 -
Zahedi 2018	108	63.82	50	149.75	51.39	51	10.4%	-0.72 [-1.12, -0.31]	
Subtotal (95% CI)			208			206	50.1%	-0.76 [-1.09, -0.43]	
Heterogeneity: Tau² =	0.10; Chi²	°= 12.30, df= 5	(P = 0.	03); I² = 5	9%				
Test for overall effect: 2	Z = 4.50 (F	P < 0.00001)							
1.3.2 Above median									
Bohn 2015	246	127	33	236	78	34	9.1%	0.09 [-0.39, 0.57]	
Eswaran 2016	3.38	2	43	4.41	2.2	39	9.8%	-0.49 [-0.93, -0.05]	
Halmos 2014	22.8	32.40439513	30	44.9	44.18781154	30	8.5%	-0.56 [-1.08, -0.05]	
Harvie 2017	128.47	87.75	23	206.31	69.59	27	7.5%	-0.98 [-1.57, -0.39]	-
McIntosh 2017	208	74.8	18	290	106	19	6.4%	-0.87 [-1.55, -0.19]	
Patcharatrakul 2019	38.5	20	30	53.5	19.2	32	8.5%	-0.76 [-1.27, -0.24]	
Subtotal (95% CI)			177			181	49.9%	-0.56 [-0.87, -0.25]	
Heterogeneity: Tau ² =	0.08; Chi ²	2 = 10.47, df = 5	(P = 0.	06); $I^2 = 5$	2%				
Test for overall effect: 2	Z = 3.53 (F	P = 0.0004)							
Total (95% CI)			385			387	100.0%	-0.66 [-0.88, -0.44]	•
Heterogeneity: Tau ² =	0.08; Chi²	e 24.01, df = 1	1 (P = 0	0.01); I ^z =	54%				-1 -05 0 05 1
Test for overall effect: 1			•	21.					
Test for subaroup diffe			1 (P =	0.40\ 12-	0.06				Favours [experimental] Favours [control]

Fig. S2 Forest plot for subgroup analysis on age

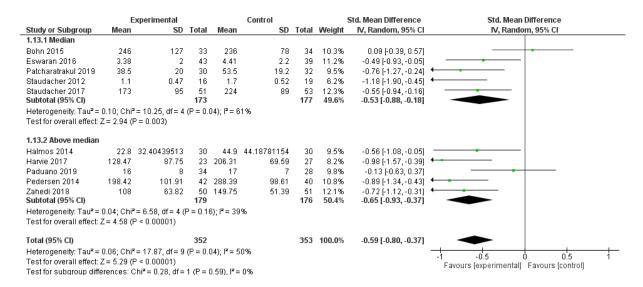


Fig. S3 Forest plot for subgroup analysis on duration

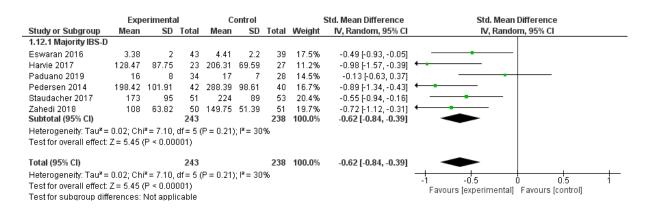


Fig. S4 Forest plot for subgroup analysis on IBS subtype

	Exp	erimenta	ıl	C	ontrol			Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
1.6.1 non-IBS-SSS									
Eswaran 2016	3.38	2	43	4.41	2.2	39	9.8%	-0.49 [-0.93, -0.05]	
Halmos 2014	22.8	32.4	30	44.9	44.19	30	8.5%	-0.56 [-1.08, -0.05]	
Ong 2010	2.52	2.01	15	5.83	2.01	15	4.9%	-1.60 [-2.44, -0.76]	←
Patcharatrakul 2019	38.5	20	30	53.5	19.2	32	8.5%	-0.76 [-1.27, -0.24]	
Staudacher 2012	1.1	0.47	16	1.7	0.52	19	5.9%	-1.18 [-1.90, -0.45]	
Subtotal (95% CI)			134			135	37.6%	-0.81 [-1.16, -0.46]	
Heterogeneity: Tau ² =	0.07; Chi²	= 7.19, c	df = 4 (F	P = 0.13);	$I^2 = 449$	%			
Test for overall effect: 2	Z = 4.58 (F	o < 0.000	01)						
1.6.2 IBS-SSS only									
Bohn 2015	246	127	33	236	78	34	9.1%	0.09 [-0.39, 0.57]	
Harvie 2017	128.47	87.75	23	206.31	69.59	27	7.5%	-0.98 [-1.57, -0.39]	
McIntosh 2017	208	74.8	18	290	106	19	6.4%	-0.87 [-1.55, -0.19]	
Paduano 2019	16	8	34	17	7	28	8.8%	-0.13 [-0.63, 0.37]	
Pedersen 2014	198.42	101.91	42	288.39	98.61	40	9.5%	-0.89 [-1.34, -0.43]	
Staudacher 2017	173	95	51	224	89	53	10.6%	-0.55 [-0.94, -0.16]	
Zahedi 2018	108	63.82	50	149.75	51.39	51	10.4%	-0.72 [-1.12, -0.31]	
Subtotal (95% CI)			251			252	62.4%	-0.56 [-0.85, -0.27]	
Heterogeneity: Tau ² =	0.09; Chi ²	= 15.27,	df = 6	(P = 0.02)	$); I^2 = 61$	%			
Test for overall effect: 2	Z = 3.75 (F	P = 0.000	12)						
Total (95% CI)			385			387	100.0%	-0.66 [-0.88, -0.44]	•
Heterogeneity: Tau ² =	0.08; Chi²	= 24.01,	df = 11	(P = 0.0)	1); l² = 5	54%			-1 -0.5 0 0.5 1
Test for overall effect: 2	Z = 5.81 (F	o.000	01)						-1 -0.5 0 0.5 1 Favours [experimental] Favours [control]
Test for subgroup diffe	erences: C	hi² = 1.1	6. df=	1 (P = 0.2)	28), I²=	13.9%			ravours (experimental) ravours (control)

Fig. S5 Forest plot for subgroup analysis on outcome measure

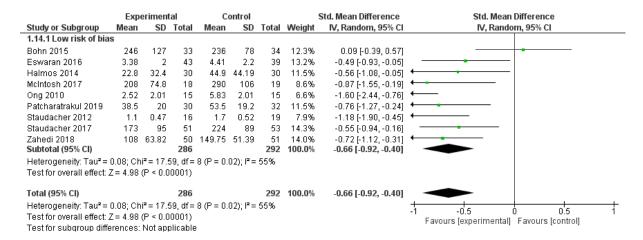


Fig. S6 Forest plot for subgroup analysis on risk of bias

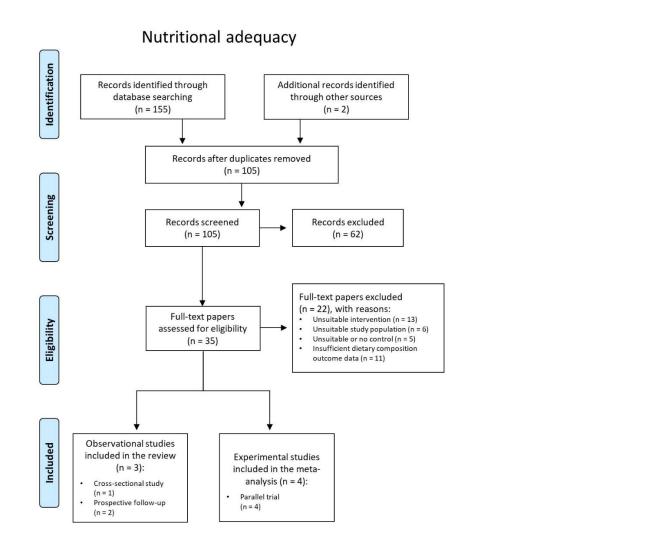


Fig. S7 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of the study selection procedure for the analysis on nutritional adequacy effects

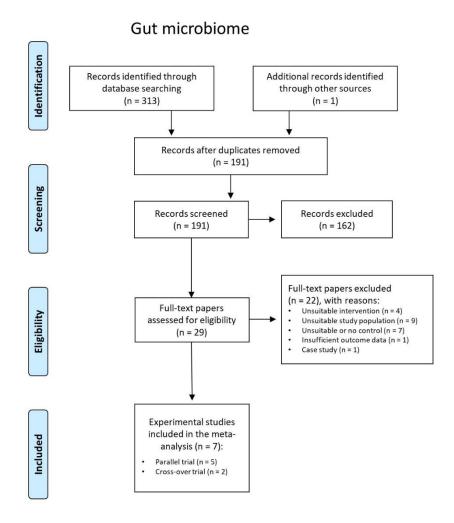


Fig. S8 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of the study selection procedure for the analysis on gut microbiome effects

PubMed search syntaxes

(FODMAP OR FODMAPS OR saccharides OR oligosaccharide OR disaccharide or monosaccharide OR polyol OR polyols OR galacto-oligosaccharides OR fructans OR fructose OR galactans OR lactose OR sorbitol OR mannitol OR xylitol OR maltitol OR sweetener OR sweeteners OR sweetening agent) AND (IBS OR irritable bowel syndrome OR irritable colon)

(FODMAP OR FODMAPS OR "Fermentable Oligo-, Di-, Mono-saccharides And Polyols" OR "low FODMAP diet") AND (microbiota OR microbiome OR "gut microbiota" OR "gut microbiome" OR "gut flora")

(FODMAP OR FODMAPS OR "Fermentable Oligo-, Di-, Mono-saccharides And Polyols" OR "low FODMAP diet") AND (nutrient* OR "nutritional profile" OR "nutrient content" OR "nutritional composition" OR "nutritional adequacy")