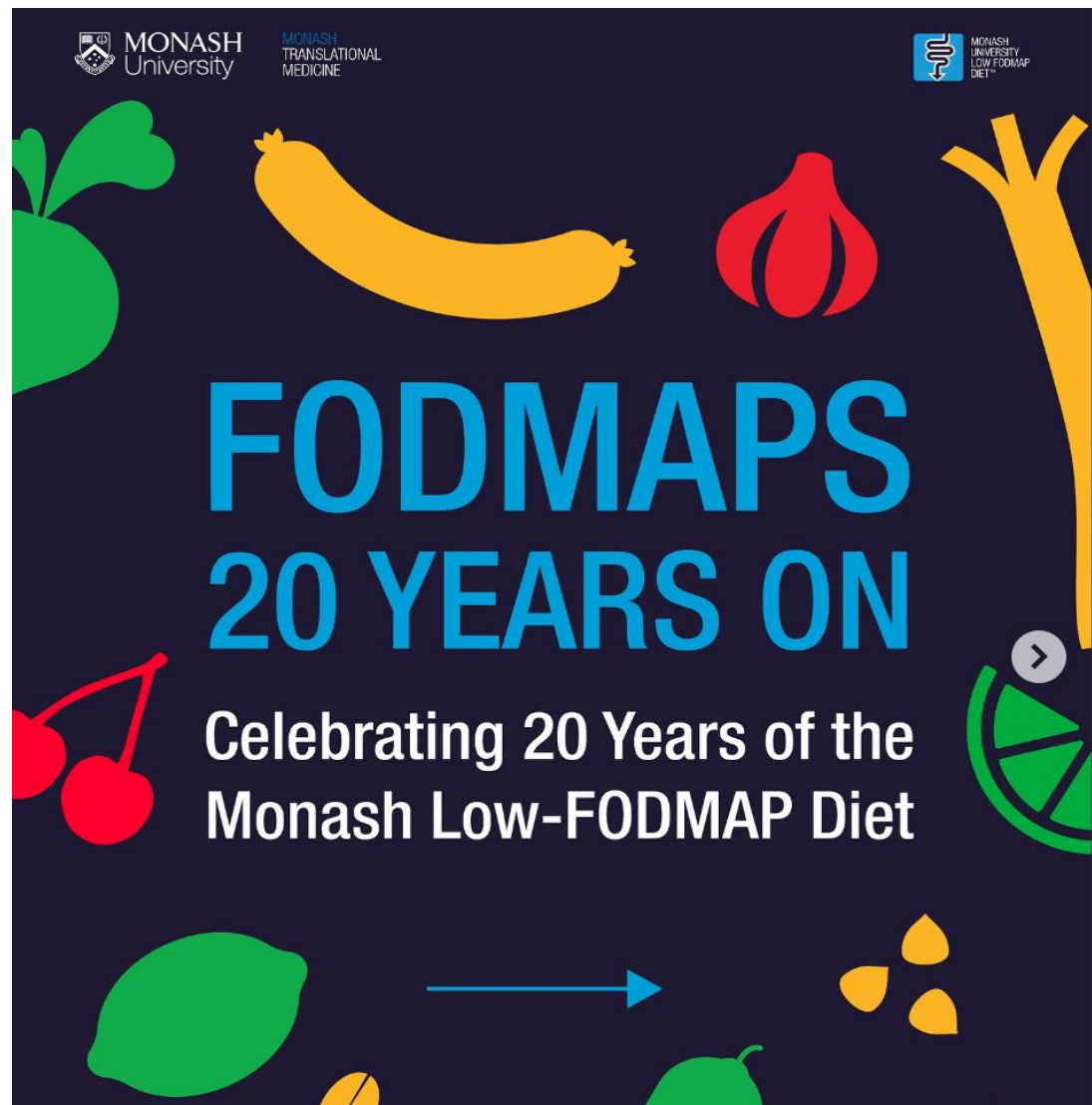


Low FODMAP Diet Concept 低腹敏飲食



台中榮總胃腸肝膽科 陳寬智 醫師 2025.12.13

What is Low FODMAP Diet?

- F- fermentable
- O- oligosaccharides
- D- disaccharides
- M- monosaccharides

- A and
- P- polyos

5 categories:

- Fructan
- Fructose
- Galacto-Oligosaccharides(GOS)
- Lactos
- Polyos

	High FODMAP foods	Low FODMAP alternatives
Vegetables	Artichoke, asparagus, cauliflower, garlic, green peas, mushrooms, onion, sugar snap peas	Aubergine/eggplant, beans (green), bok choy, green capsicum (bell pepper), carrot, cucumber, lettuce, potato, zucchini
Fruits	Apples, apple juice, cherries, dried fruit, mango, nectarines, peaches, pears, plums, watermelon	Cantaloupe, kiwi fruit (green), mandarin, orange, pineapple
Dairy & alternatives	Cow's milk, custard, evaporated milk, ice cream, soy milk (made from whole soybeans), sweetened condensed milk, yoghurt	Almond milk, brie/camembert cheese, feta cheese, hard cheeses, lactose-free milk, soy milk (made from soy protein)
Protein sources	Most legumes/pulses, some marinated meats/poultry/seafood, some processed meats	Eggs, firm tofu, plain cooked meats/poultry/seafood, tempeh
Breads & cereals	Wheat/rye/barley based breads, breakfast cereals, biscuits and snack products	Corn flakes, oats, quinoa flakes, quinoa/rice/corn pasta, rice cakes (plain), sourdough spelt bread, wheat/rye/barley free breads
Sugars, sweeteners & confectionery	High fructose corn syrup, honey, sugar free confectionery	Dark chocolate, maple syrup, rice malt syrup, table sugar
Nuts & seeds	Cashews, pistachios	Macadamias, peanuts, pumpkin seeds/pepitas, walnuts

<https://www.monashfodmap.com/about-fodmap-and-ibs/>

Global FODMAP Diet Intake

Table 3
Habitual intake of individual and total FODMAPs in the population.

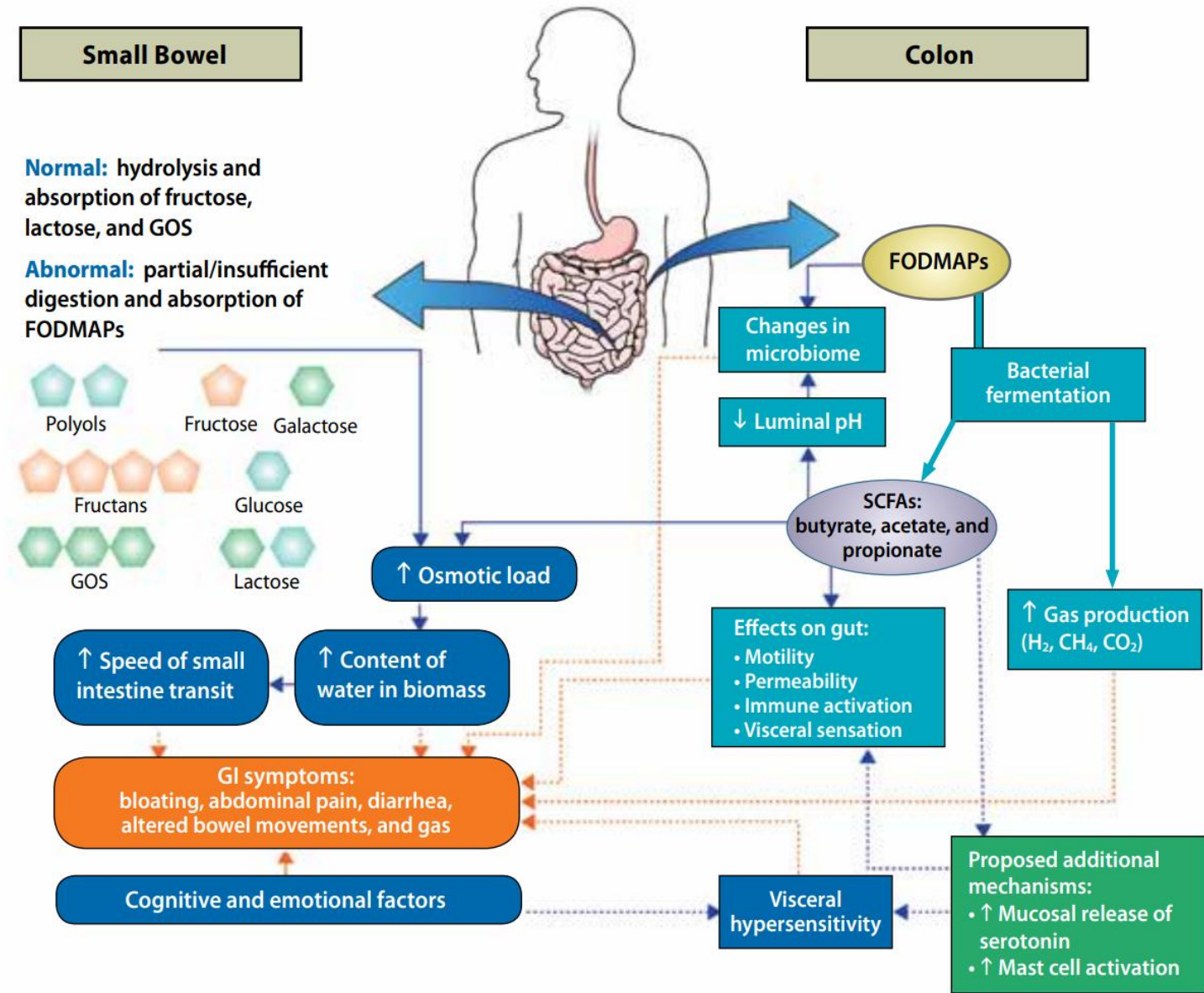
Fermentable oligo-, di-, mono- saccharides and polyols	Overall		Sub-grouped				
	Mean (95 % CI)	Sample size (n)	Healthy Mean (95 % CI)	Sample size (n)	FGID and other GI disorders Mean (95 % CI)	Sample size (n)	P-value
Fructose	13.26 (10.52, 16.19)	2791	16.06 (10.82, 21.29)	967	12.2 (8.6, 15.79)	1809	0.19
Excess fructose	2.43 (1.92, 2.94)	115,617	2.52 (1.5, 3.54)	112,757	2.34 (1.75, 2.94)	2845	0.74
GOS	0.78 (0.64, 0.92)	113,820	0.88 (0.48, 1.28)	110,911	0.76 (0.62, 0.89)	2846	0.55
Fructans	3.51 (3.1, 3.93)	132,300	4.01 (3.26, 4.75)	129,006	3.15 (2.7, 3.6)	3186	0.05
Stachyose	0.27 (-0.35, 0.9)	2648	0.27 (-0.35, 0.9)	2648	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
Raffinose	0.25 (-0.067, 0.58)	2648	0.25 (-0.067, 0.58)	2648	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
Total oligosaccharides	3.73 (3.06, 4.41)	955	3.84 (3.18, 4.49)	721	3.56 (2.26, 4.87)	234	0.65
Lactose	10.1 (8.88, 11.31)	117,487	11.46 (8.59, 14.34)	113,633	9.48 (8.14, 10.82)	3828	0.2
Sorbitol	1.02 (0.79, 1.25)	4939	1.07 (0.61, 1.54)	3882	0.95 (0.68, 1.23)	1042	0.63
Mannitol	0.33 (0.23, 0.43)	4939	0.31 (0.11, 0.51)	3882	0.35 (0.23, 0.48)	1042	0.68
Total polyols	1.49 (1.16, 1.82)	112,412	1.85 (1.07, 2.63)	110,262	1.34 (0.98, 1.71)	2150	0.19
Total FODMAPs	19.86 (18.12, 21.6)	120,513	22.36 (19.31, 25.42)	117,610	18.05 (15.89, 20.22)	2846	0.018

Notes: CI, confidence interval; FGID, functional gastrointestinal disease; FODMAPs, fermentable oligo-, di, mono-saccharides and polyols; GI, gastrointestinal; GOS, galacto-oligosaccharides; *n.a.*, not available.

- Meta-analysis published in 2024 that included countries from the Mediterranean basin (Greece, too), the estimated **global FODMAP intake is 19.86 g/d**, regardless of health status.

LFD concepts

- Propose mechanism:
 - Insufficient digestion and absorption
 - Osmotic effect of short chain CHO
 - Bacterial fermentation
 - Change in the gut microbiome
 - Decreased luminal pH
- Leading to :
 - Increase gas production
 - Change to motility, permeability, luminal distention, immune activation, and/or visceral hypersensitivity.
 - Possible mast cell activation and serotonin release



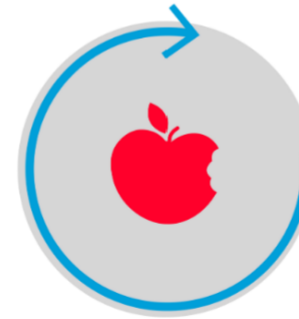
3-steps of LFD

- Elimination phase
 - * 2-6 weeks
- Reintroduction phase
 - * 4-8 weeks
- Personalization phase
 - * Long term liberalized approach

The 3 steps of the FODMAP diet



Step 1
Low FODMAP Diet



Step 2
FODMAP Reintroduction



Step 3
FODMAP Personalization

<https://www.monashfodmap.com/blog/3-phases-low-fodmap-diet/>

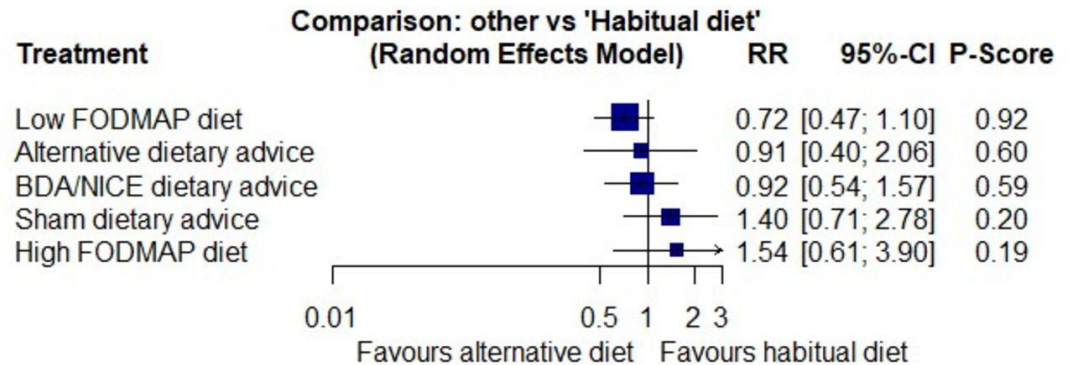
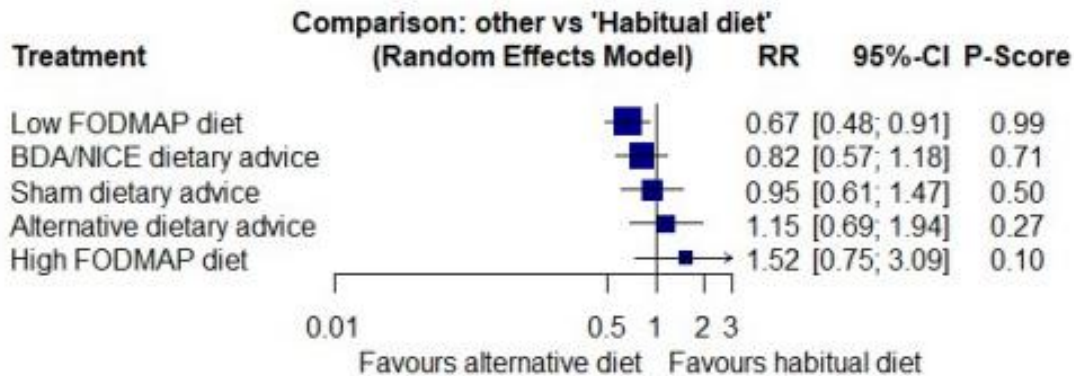
What is the LFD evidence in IBS?

- **Systemic review and meta-analysis (2022):**

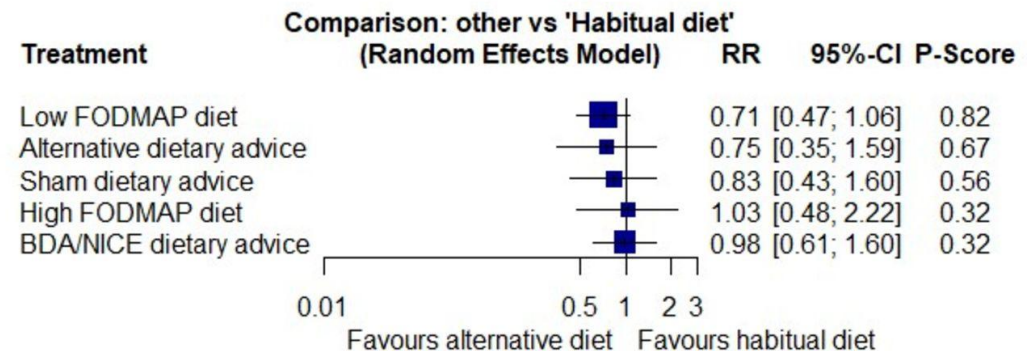
- **Restriction of FODMAPs** improves **global IBS symptoms (abdominal pain/discomfort, bloating, altered bowel habits)** (RR1.54, 95% CI1.2-2.0) and is recommended in guidelines

Pain

Global symptoms



Bloating



What is the LFD evidence in IBS?

- **Systemic review and meta-analysis (2024):**

- The LFD reduces IBS symptoms and improves QoL in efficacy RCTs and in real-world studies.

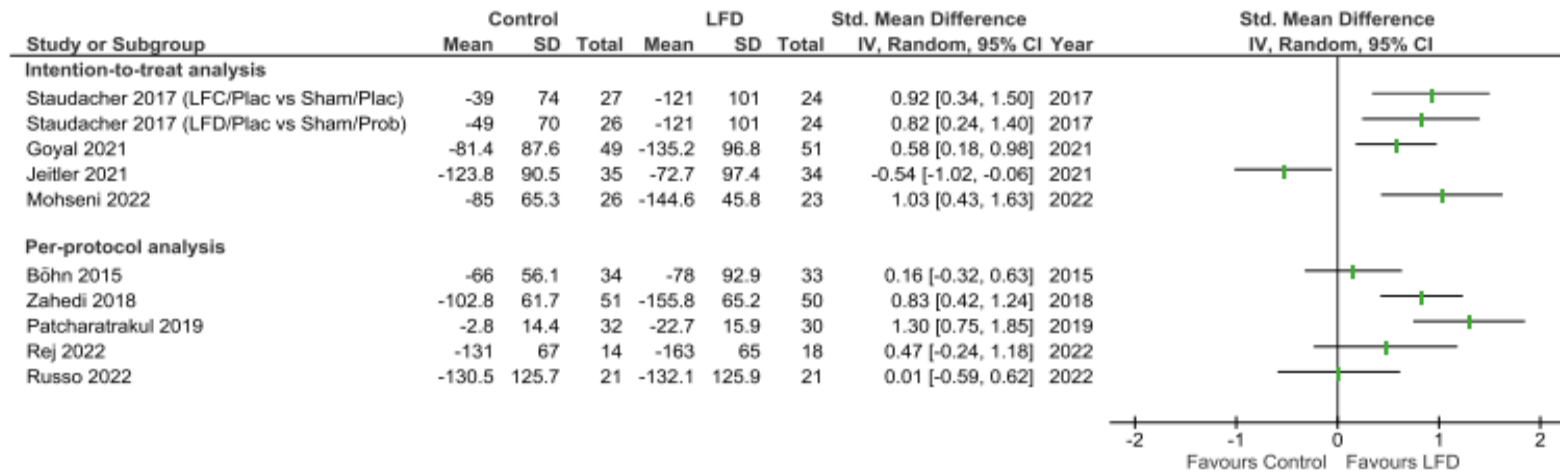
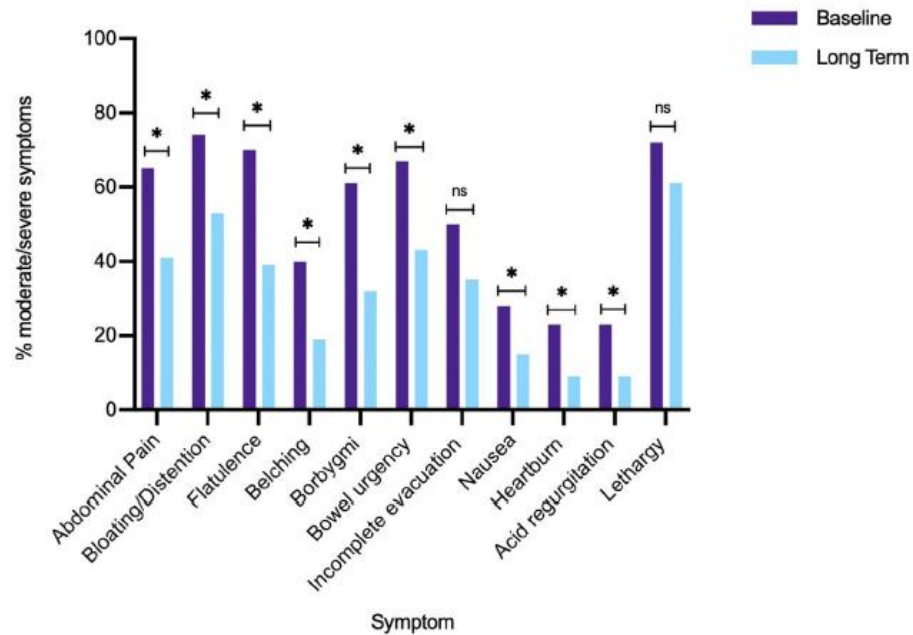


Fig. 7. Change in overall symptoms, efficacy PICOS.

- Results:
 - In **both RCT and real-world PICOS groups** – **LFD improves outcomes** more than control diets(efficacy PICOS) or compared to baseline data(real-world PICOS)
 - Symptom reduction seems to be sustained in the long term, but **data on long term-effects remain scarce**

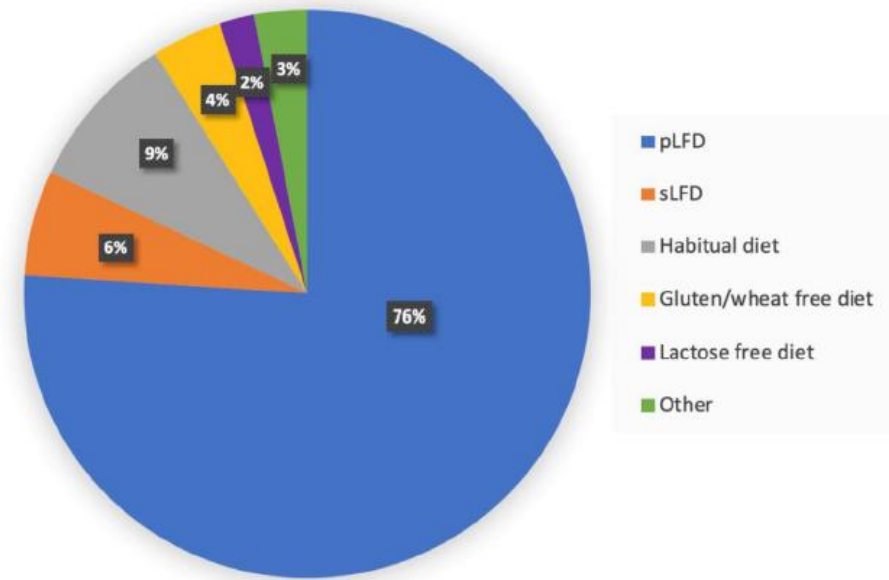
LFD efficacy – long term

- 205 IBS pts at 6 UK centers on a dietitian led LFD for a mean of 44 months
- >60% continued to well and >75% were on a personalized version of the LFD



*; statistically significant, ns; not statistically significant

Fig. 2. Symptoms at baseline versus long term follow up as assessed by GSRS.



pLFD; personalisation phase of low FODMAP diet, sLFD; strict reduction phase of low FODMAP diet

Fig. 3. Diet at Long Term Follow Up.

- Personalisation phase of the low FODMAP diet (pLFD).
- Standard low FODMAP diet (sLFD).

Types of dietary advice

Figure 2. Responder rate comparison between structural individual low-FODMAPs diet advice (SILFD) and brief advice on a commonly recommended diet (BRD) for IBS patients.

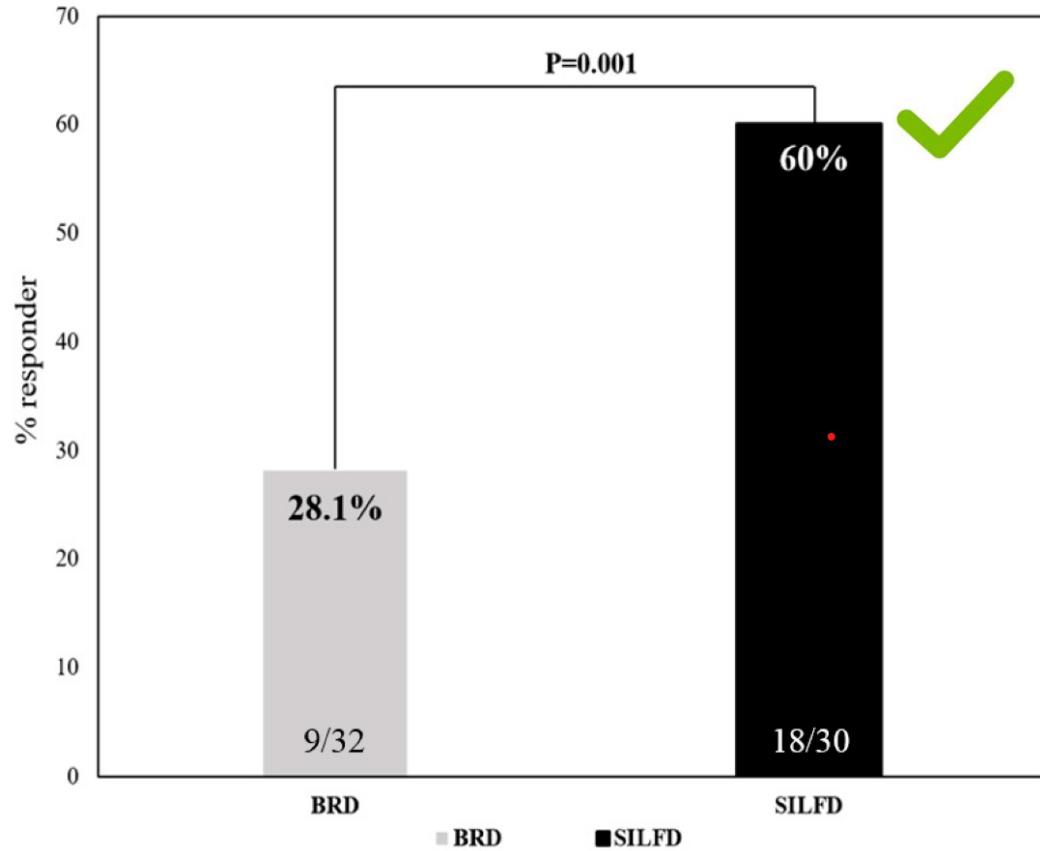
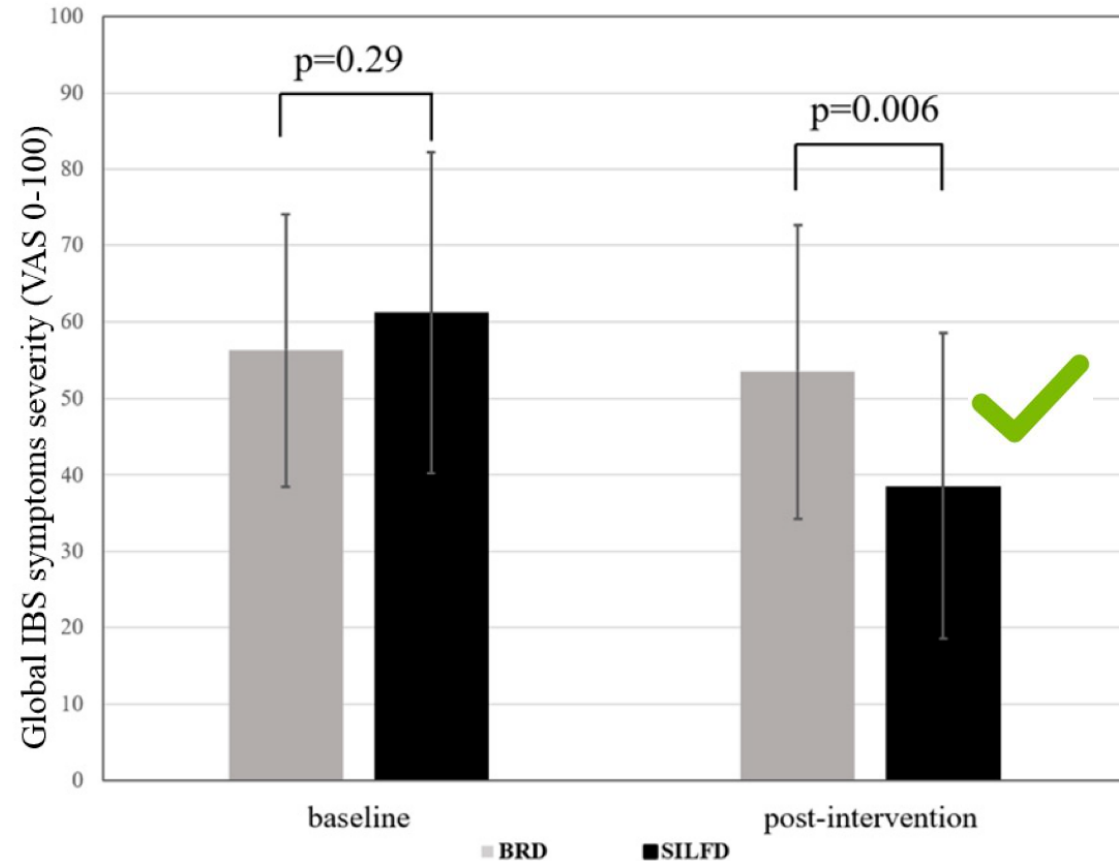


Figure 3. Global IBS symptom severity score comparing structural individual low-FODMAPs diet advice (SILFD) and brief advice on a commonly recommended diet (BRD) for IBS patients. VAS: visual analog scale.



- Brief Advice on a Commonly Recommended Diet (BRD): 5 min
- Structural Individual Low-FODMAP Dietary Advice (SILFD): 30 min

Times of dietary advice

BRIEF COMMUNICATION 923

Utilization of Dietitians in the Management of Irritable Bowel Syndrome by Members of the American College of Gastroenterology

Kate Scarlata, MPH, RDN¹, Shanti Eswaran, MD², Jason R. Baker, PhD³ and William D. Chey, MD²

Q7. For new IBS outpatient visits, how much time do you typically spend counseling patients about their diet?	31–40 min or more, 7 (3%)
	21–30 min, 11 (4%)
	11–20 min, 45 (16%)
	6–10 min, 119 (43%)
	1–5 min, 93 (33%)
	0 min (typically no diet counseling), 4 (1%)

- **77%** Gastroenterologist spent **< 10 mins** for **nutrition counseling**.

Q13. Do you have access to a local GI dietitian (i.e., adequately trained in applying the low-FODMAP diet or other nutritional therapies) to provide service to your IBS patients?	Yes, 162 (58%)
	No, 116 (42%)

- Still **42%** lack access to a local GI dietitian.

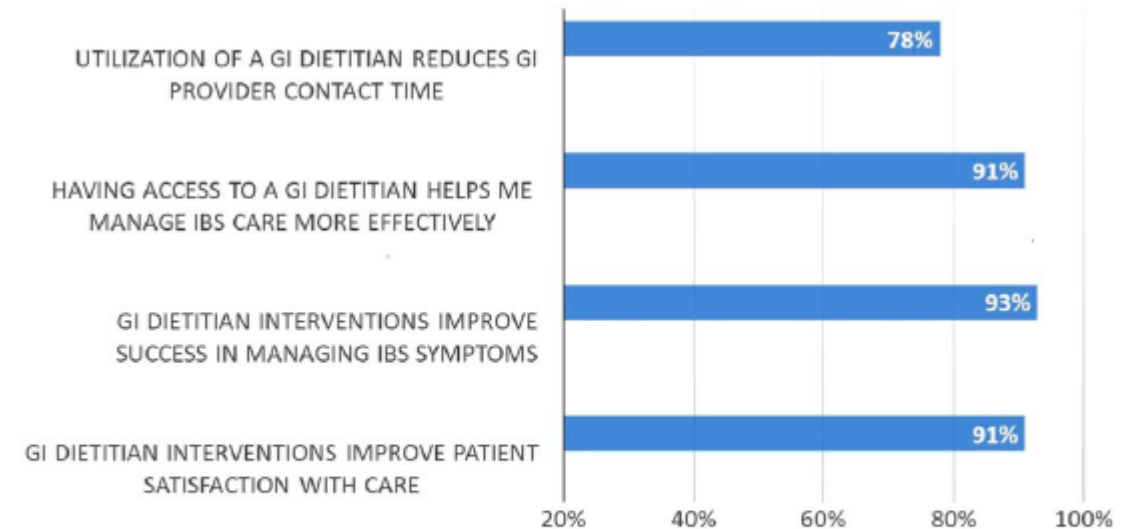


Figure 1. GI practitioners (with access to dietitian services) beliefs (in percentages) regarding dietitian-led interventions. GI, gastroenterology.

- **91%** strongly agreed that having **access to a GI dietitian** would help them manage their IBS patient care more effectively.

IBS guideline and LFD

ACG Clinical Guideline: Management of Irritable Bowel Syndrome (2021)

- We recommend a limited trial of a low FODMAP diet in patients with IBS to *improve global IBS symptoms*.
Conditional recommendation; *very low quality of evidence*

AGA Clinical Practice Update on the Role of Diet in Irritable Bowel Syndrome: Expert Review(2022)

- Best Practice Advice 6: The *LFD is currently the most evidence-based diet intervention for IBS*. Healthy eating advice as described by the National Institute of Health and Care Excellence Guidelines, among others, also offers benefit to a subset of patients with IBS.
- Best Practice Advice 7: The LFD consists of 3 phases: *1) restriction (lasting no more than 4–6 weeks), 2)reintroduction of FODMAP foods, and 3) personalization* based on results from reintroduction.

Rome foundation & AGA Clinical Practice Update on the Role of Diet in Irritable Bowel Syndrome: Expert Review(2025)

- Quality indicators for IBS
 - *Dietary counseling* (eg, increased soluble fiber or low fermentable oligo-, di-, mono-saccharide and polyol [FODMAP] diet) or *referral to a dietitian*.

Pros & Cons of LFD

- **Pros**

- High level of success when completed with dietitian
- Documented improvement to abdominal bloating and pain with IBS-D
- Lots brands available
- Lots of resources for patients to use
- Skilled expert dietitians exist
- Potential positive impact to Global symptoms and QoL

- **Cons**

- LFD may exacerbate eating disorders behaviors in IBS
- Dietary adequacy risks – B1, B2, B9, calcium, iron and magnesium, calories, carbohydrates, fiber
- Highly technical – required trained GI dietitian
- Patient can get stuck in elimination phase
- Potential negative impact to QoL

台中榮總低腹敏飲食營養門診 -2024年_營養師公會全聯會投稿_FODMAP飲食治療模式

臺中榮民總醫院
Taichung Veterans General Hospital

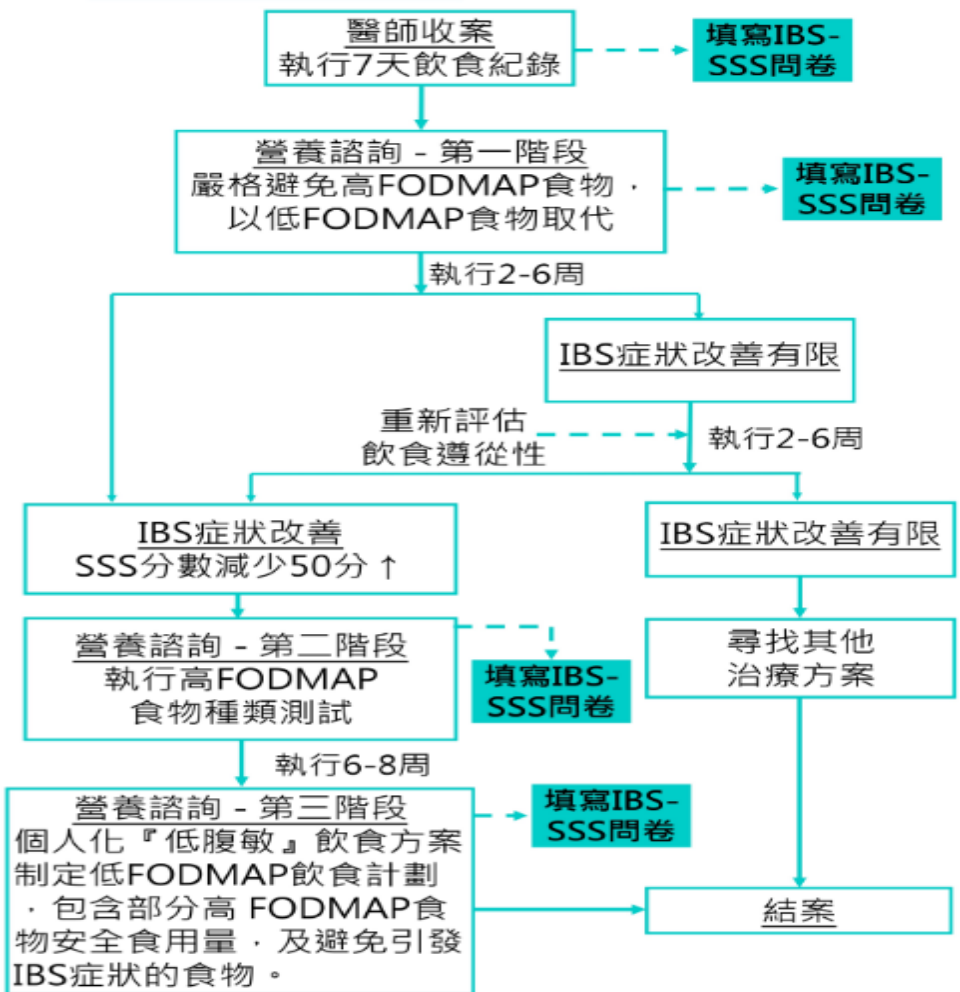
愛心 · 品質 · 創新 · 當責
Compassion Quality Innovation Accountability

建立FODMAP飲食治療模式

王嘉濡¹、王文宏¹、郎惠芬¹、謝惠敏¹、林穎正²、連漢仲²

臺中榮民總醫院營養室¹、胃腸肝膽科醫師²

治療流程



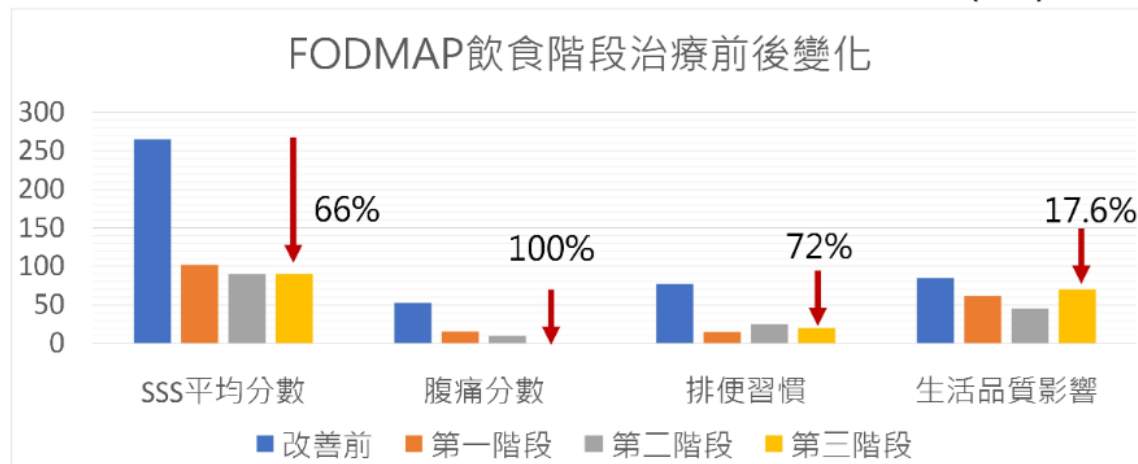
**IBS-SSS(IBS Symptom Severity Scale): 評估腸躁症症狀嚴重程度, 共有5個評分標準(腹痛嚴重程度、持續時間、腹脹、排便習慣、生活品質影響), 每個標準100分。

結果

112年9月至113年4月, 參加本院FODMAP飲食治療共8名病人。

	治療前	第一階段	第二階段	第三階段
SSS分數	265	102	90	90
腹痛分數	52.5	15.5	10	0
排便習慣	77.5	15	25	20
生活品質影響分數	85	61.5	45	70

表一、FODMAP飲食各階段治療對於IBS症狀的改善分數。(註1)



圖一、FODMAP飲食各階段治療對於IBS症狀的改善情形。(註1)

註1: 因每位病人完成階段不同, 每階段樣本數不同, 可能影響數據分析結果。



Dietary Characteristics of Irritable Bowel Syndrome Patients: A Comparative and Severity-Based Perspective

Jia-Ru Wang¹, Ying-Cheng Lin^{2,3}, Wei-Chun Chen⁴, Yi-Hsuan Chen⁵, Shiang-Jie Huang¹, Chao-Hsiu Chen¹, Ya-Ling Wang¹, Wei-Chen Chen¹, Hui-Fen Lang¹, Wen-Hong Wang¹, Shang-Yu Wen¹, Yen-Ching Wang², Ping-Huan Lee², Han-Chung Lien^{2,3,6}

Results

Table 1. Baseline characteristics and nutrition Intake: IBS vs. Controls

Mean(95%CI)	Baseline characteristics & Nutrition Intake		p value	Proportion meeting diet reference		p value
	IBS (n=64)	Healthy control (n=32)		IBS (n = 64)	Healthy control (n = 32)	
Age	54.7 (28.1 , 81.3)	51.2 (30.3 , 72)	0.082	-	-	-
Female	52 (81.3%)	27 (84.4%)	-	-	-	-
BMI (kg/m ²)	21.7 (14.7 - 28.6)	22.4 (17.5 - 27.2)	0.475	-	-	-
FODMAP intake (g)	7.9 (-4.2 - 20)	14.1 (-7.1 - 35.3)	<0.01**	-	-	-
Excess fructose (g)	1.0 (0.6, 1.4)	1.2 (0.8, 1.6)	0.542	-	-	-
Lactose (g)	2.9 (1.5, 4.3)	9.2 (5.4, 13.0)	<0.01**	-	-	-
Sorbitol (g)	0.4 (0.3, 0.5)	0.7 (0.2, 1.1)	0.343	-	-	-
Mannitol (g)	0.2 (0.1, 0.2)	0.2 (0.1, 0.2)	0.662	-	-	-
Fructans (g)	2.8 (2.6, 3.1)	2.2 (1.8, 2.6)	<0.01**	-	-	-
GOS (g)	0.5 (0.4, 0.6)	0.7 (0.5, 0.9)	0.094	-	-	-
T-MEDAS	6.6 (2.9 , 10.3)	6.7 (3.6 , 9.8)	0.470	-	-	-
Diet diversity score	3.4 (1.4 , 5.4)	3.5 (1.5 , 5.4)	0.947	-	-	-
Energy intake (kcal)	1608.2 (813.2 , 2403.1)	1718.7 (1055.8 , 2381.5)	0.217	30 (46.9)	19 (59.4)	0.284
Protein (g)	63.6 (26.7 , 100.6)	70.4 (41.1 , 99.7)	0.083	48 (75.0)	29 (90.6)	0.102
Fat (g)	74.4 (32 , 116.8)	74.9 (46 , 103.8)	0.611	Not available	Not available	-
Carbohydrate (g)	175.6 (72.3 , 279)	195.6 (83.9 , 307.4)	0.148	49 (76.6)	29 (90.6)	0.164
Dietary fiber (g)	17.1 (4.2 , 29.9)	17.1 (1.4 , 32.7)	0.630	12 (18.8)	3 (9.4)	0.372
Calcium (mg)	416 (43.9 , 788.1)	662.8 (76.9 , 1248.6)	<0.01**	0 (0.0)	5 (15.6)	<0.01**
Iron (mg)	9.8 (2.8 , 16.9)	11.3 (3.3 , 19.3)	0.170	25 (39.1)	16 (50.0)	0.383
Zinc (mg)	7.8 (2.7 , 12.9)	9 (4.1 , 13.9)	0.023*	3 (4.7)	3 (9.4)	0.397
Phosphorus (mg)	928.3 (297.6 , 1559)	1067.7 (588.9 , 1546.4)	0.017*	45 (70.3)	27 (84.4)	0.211
Vitamin B1 (mg)	0.9 (0.2 , 1.6)	1 (0.2 , 1.9)	0.487	31 (48.4)	15 (46.9)	1.000
Vitamin B2 (mg)	1 (0.3 , 1.7)	1.2 (0.5 , 2)	<0.01**	24 (37.5)	21 (65.6)	0.016*
Niacin (mg)	13.4 (2.9 , 23.9)	14.1 (6.5 , 21.7)	0.371	27 (42.2)	15 (46.9)	0.670
Vitamin B6 (mg)	1.5 (0.5 , 2.5)	1.6 (0.5 , 2.6)	0.852	34 (53.1)	14 (43.8)	0.516
Vitamin B12 (ug)	8 (-17.8 , 33.9)	3.4 (-1.7 , 8.6)	0.049*	45 (70.3)	17 (53.1)	0.116
Folate (ug)	242.3(70.5 , 414.2)	297.8(122.6 , 473)	<0.01**	2 (3.1)	5 (15.6)	0.039*
Vitamin C (mg)	128.4(-19.8,276.6)	134.3 (-16.9 , 285.5)	0.652	38 (59.4)	23 (71.9)	0.267

Table 2. Baseline characteristics and nutrition Intake in IBS: Mild vs. Moderate/Severe

Mean(95%CI)	Baseline characteristics & Nutrition Intake		p value	Proportion meeting diet reference		p value
	Remission/Mild (n=25)	Moderate/Severe (n=39)		Remission/Mild (n=25)	Moderate/Severe (n=39)	
Age	60.8 (43.2 , 78.4)	50.8 (22.2 , 79.4)	<0.01**	-	-	-
Female	20 (80%)	32 (82.1%)	-	-	-	-
BMI (kg/m ²)	22.2 (17.1 , 27.4)	21.3 (13.3 , 29.2)	0.222	-	-	-
FODMAP intake(g)	8.2 (-2.8 , 19.2)	7.7 (-5.2 , 20.6)	0.158	-	-	-
Excess fructose(g)	1.3 (-3 , 5.5)	0.9 (-0.9 , 2.7)	0.449	-	-	-
Lactose (g)	2.4 (-7.2 , 12)	3.2 (-8.7 , 15)	0.971	-	-	-
Sorbitol (g)	0.5 (-0.4 , 1.4)	0.4 (-0.4 , 1.2)	0.353	-	-	-
Mannitol (g)	0.2 (-0.3 , 0.7)	0.2 (-0.2 , 0.6)	0.761	-	-	-
Fructans (g)	3.2 (0.9 , 5.4)	2.6 (0.9 , 4.3)	0.052	-	-	-
GOS (g)	0.7 (-0.1 , 1.5)	0.5 (-0.3 , 1.2)	0.048*	-	-	-
T-MEDAS	7.1 (6.2 , 8.1)	6.1 (5.5 , 6.6)	0.049*	-	-	-
Diet diversity score	3.7 (3.4 , 4.1)	3.2 (2.9 , 3.6)	0.048*	-	-	-
Energy intake (kcal)	1711.6 (1149 , 2274.2)	1541.9 (645.6 , 2438.2)	0.128	14 (56.0%)	16 (41.0%)	0.249
Protein (g)	70.3 (39.9 , 100.7)	59.4 (20.7 , 98)	0.032*	23 (92.0%)	25 (64.1%)	0.017*
Fat (g)	77.4 (39.2 , 115.5)	72.5 (27.5 , 117.6)	0.487	Not available	Not available	-
Carbohydrate (g)	189.6 (114.2 , 265)	166.7 (51.3 , 282.2)	0.060	22 (88.0%)	27 (69.2%)	0.130
Dietary fiber (g)	19.2 (9.3 , 29)	15.8 (1.8 , 29.7)	0.023*	6 (24.0%)	6 (15.4%)	0.514
Calcium (mg)	446.7 (96.5 , 796.8)	396.3 (11.4 , 781.3)	0.213	0	0	1.000
Iron (mg)	11.2 (5.3 , 17)	9 (1.7 , 16.3)	0.016*	14 (56.0%)	11 (28.2%)	0.037*
Zinc (mg)	8.8 (4.9 , 12.6)	7.2 (1.7 , 12.6)	<0.01**	2 (8.0%)	1 (2.6%)	0.555
Phosphorus (mg)	1026.6 (576.9 , 1476.4)	865.2 (164.1 , 1566.3)	0.026*	23 (92.0%)	22 (56.4%)	<0.01*
Vitamin B1 (mg)	1.1 (0.6 , 1.6)	0.9 (0.1 , 1.6)	<0.01**	17 (68.0%)	14 (35.9%)	0.020*
Vitamin B2 (mg)	1.1 (0.5 , 1.7)	0.9 (0.2 , 1.7)	<0.01**	12 (48.0%)	11 (28.2%)	0.120
Niacin (mg)	15 (5.3 , 24.7)	12.4 (1.8 , 23)	0.085	12 (48.0%)	15 (38.5%)	0.605
Vitamin B6 (mg)	1.7 (0.9 , 2.5)	1.4 (0.3 , 2.5)	0.032*	18 (72.0%)	16 (41.0%)	0.021*
Vitamin B12 (ug)	11.7 (-25.3 , 48.7)	5.7 (-8 , 19.4)	0.123	20 (80.0%)	25 (64.1%)	0.263
Folate (ug)	282.1(135.4,428.7)	216.9(47.1 , 386.7)	<0.01**	1 (4.0%)	1 (2.6%)	1.000
Vitamin C (mg)	133.8 (7.4 , 260.2)	124.9 (-37 , 286.7)	0.268	16 (64.0%)	22 (56.4%)	0.609

- Overall FODMAP intake was reduced among IBS patients, largely driven by lower lactose consumption.
- IBS patients had lower energy, fat, and micronutrient intake compared with healthy controls, particularly calcium, zinc, phosphorus, and B-vitamins, with inadequacies more pronounced in moderate to severe cases.

Conclusions

IBS patients had poorer nutrient adequacy than controls. Symptom severity was significantly associated with reduced diet quality, dietary diversity, and nutrient adequacy, emphasizing the need for early nutritional assessment.

References

- Clinical Gastroenterology and Hepatology 2024;22:164-172
- J Acad Nutr Diet . 2020 Apr;120(4):535-547

Summary

- 低腹敏飲食是目前 IBS 有證據支持的飲食治療
 - 可改善 IBS global symptoms、腹痛、脹氣。
- 標準做法要走 3 階段：
 - (1) 2-6 週的消除期 → (2) 4-8 週的重新導入期 → (3) 長期個人化飲食。
 - 不能一直停留在消除期，容易造成營養不足與生活品質下降。
- 低腹敏飲食 ACG 與 AGA 指引都推薦短期嘗試。效果最好時需由受訓 GI 營養師指導。

Thank you for your attention

- Ref.
- <https://www.monashfodmap.com/about-fodmap-and-ibs/>
- Gastroenterol Hepatol (N Y). 2019 Jan;15(1):16–26
- Jent s, Bez NS, Clin Nutr . 2024 Jun;43(6):1551-1562
- Dig Liver Dis. 2021 Nov;53(11):1404-1411.
- ACG Clinical Guideline: Management of IBS
- AGA Clinical Practice Update on the Role of Diet in IBS: Expert Review(2022)
- Rome foundation & AGA Clinical Practice Update on the Role of Diet in Irritable Bowel Syndrome: Expert Review(2025)
- <https://www.ibsdiets.org/fodmap-diet/fodmap-food-list/>
- 2025 DDW on-demand course

功能性食道疾病中心醫師門診時間表

時間	週一	週二	週三	週四	週五
上午	• 連漢仲醫師		• 連漢仲醫師 • 王彥景醫師		• 王彥景醫師
下午	• 林穎正醫師			• 林穎正醫師	



▲ 美國密西根大學胃腸肝膽科主任、美國胃腸病醫學會(American College of Gastroenterology)候任主席William D. Chey至本院演講「飲食介入在腸躁症的角色」，會後與營養師分享營養治療腸道疾病的經驗。