Psychological Considerations in the Dietary Management of Patients With DGBI

Helen Burton Murray, PhD1,2, Bethany Doerfler, MS, RD3, Kimberly N. Harer, MD, ScM4 and Laurie Keefer, PhD5

In this article, an expert team of 2 gastro-psychologists, a dietician, and an academic gastroenterologist provides insights into the psychological and social implications of evidence-based and “popular” dietary interventions in disorders of gut-brain interaction (DGBI). We focus on practical approaches for evaluating a patient’s appropriateness for a dietary intervention, considering the nutritional, psychological, behavioral, and social context in which a patient may find themselves managing their DGBI with dietary intervention. We also discuss how to identify risk factors for and symptoms of avoidant/restrictive food intake disorder, a growing concern in the DGBI population.

Am J Gastroenterol 2022;117:985–994. https://doi.org/10.14309/ajg.0000000000001766

INTRODUCTION

Dietary interventions for the management of symptoms associated with disorders of gut-brain interaction (DGBI) are increasingly prescribed as part of integrated care (1), with varying levels of evidence or scientific premise (see review in this edition) (2). For example, gluten-free and lactose-free diets are commonly recommended for patients with irritable bowel syndrome (IBS) (2), despite limited understanding of the role these foods play in the pathogenesis or maintenance of DGBI symptoms, especially over the long term. The low fermentable oligosaccharides, disaccharides, monosaccharides and polyols (FODMAP) diet may have a stronger scientific premise in DGBI (specifically for IBS) (3–5) but without properly designed meal planning, and a plan for food reintroduction could be harmful over the long term (6,7). Several “popular diets” have also been adopted by patients with DGBI that involve significant food restriction with little or no scientific justification and could worsen symptoms (e.g., excess fructose consumption in the Whole 30 diet) or other health outcomes (e.g., higher saturated fat intake in “the Plant Paradox” diet) (8,9).

Patient-provider collaboration around the choice of dietary intervention is critical to the proper uptake and safety of any dietary intervention—these may include a patient’s expectations for risks and benefits because they relate to symptom improvement, quality of life and emotional well-being, as well as agreement on the anticipated duration of the diet and any follow-up requirements. Whenever possible, a registered dietitian (RD) should be included as part of the patient’s care team. Health psychologists may also be helpful in assisting the care team in the choice of dietary intervention, improving adherence and supporting lifestyle change, as well as identifying disordered eating behaviors, eating disorders, or other contraindications to restrictive dietary interventions.

In this article, we provide insights into the psychological and social implications of evidence-based and popular dietary interventions in DGBI. We focus on practical approaches for evaluating a patient’s appropriateness for a dietary intervention, considering the nutritional, psychological, behavioral, and social context in which a patient may find themselves managing their DGBI with dietary intervention (Figure 1). Below, we delineate practical approaches for (i) managing patient expectations around the role of food allergy and motility testing, (ii) evaluating the scientific premise for food elimination or restriction with the patient’s psychological and nutritional risks and benefits in mind, (iii) recognizing risk for disordered eating, and (iv) developing a pathway for low-resource patients to access safe dietary interventions when appropriate.

Managing patient expectations around the role of food allergy and motility testing to inform dietary intervention choice

The psychological and nutritional impact of GI testing is an important consideration when evaluating patients with GI symptoms. Previous studies have shown that a diagnosis of a food allergy is associated with increased food anxiety, social isolation, and decreased quality of life (10–13). Thus, it is important to focus on evidence-based allergy testing methods and educate patients about the pitfalls of other testing methods.

For example, oral food challenge, skin prick testing, and serum Immunoglobulin E (IgE) testing are the gold standard methods of food allergy testing when food allergy symptoms are present. Serum Immunoglobulin G (IgG) testing and commercially available food sensitivity panels are increasing in popularity but should be approached with extreme caution because of the lack of clinical relevance and the negative impact a positive result may have on dietary restriction and quality of life. Serum IgG testing and antigen leukocyte antibody test are not recommended to diagnose food allergies, hypersensitivities, or intolerances because of low test specificity and poor reproducibility (14). Although a positive serum IgG or antigen leukocyte antibody test does not indicate a food allergy or sensitivity, patients often interpret the test result as an allergy, which can subsequently result in labeling those foods as unsafe and harmful and drive the implementation of unnecessary food restrictions. Thus,
GI-associated tests to evaluate DGBI symptoms as they relate to eating behavior can also have negative psychological and dietary impact, regardless if the test is normal or abnormal. Abnormal testing can result in rash dietary changes (e.g., gastric emptying study resulting in recommendation of implementing a restrictive gastroparesis diet). Alternatively, the psychological impact of negative testing should also be appreciated. Negative testing can result in disappointment and frustration because of a lack of identified etiology for the patient’s suffering and symptoms. The frustrations of multiple normal test results are also amplified in the DGBI population secondary to the paucity of diagnostic testing available for motility and functional disorders because many DGBI diagnoses occur after negative tests evaluating for other diagnoses. It is important for providers to set expectations regarding what a positive or negative test result will mean and reassure patients that their symptoms will continue to be treated, regardless of test results.

**Evaluating the scientific premise for food elimination or restriction with the patient’s psychological and nutritional risks and benefits in mind**

It is crucial to weigh the benefits of dietary interventions in the context of (i) nutrients and calories at risk, (ii) the time frame or duration of the dietary intervention, and (iii) the behavioral risk factors, social implications (e.g., access, cost, and cultural practices), and the impact of the diet on quality of life. These considerations to patients who are already following a diet that you would like them to liberate, or for patients who are asking about a diet they could follow for immediate symptom relief. Table 2 defines and highlights possible risks associated with popular diets that may be commonly self-initiated by patients (Table 2) and evidence-based diets that may be either self-initiated by patients or medically prescribed (Table 3) to treat DGBI.

**Nutrients and calories at risk.** Dietary restriction is usually associated with nutrient deficiencies that should be monitored and potentially supplemented—for example, several nutrients are at risk in a gluten-free diet, including folic acid, B6, thiamin, riboflavin, niacin, iron, and dietary fiber—these may need to be assessed quarterly and supplemented as appropriate if the patient is on the long-term diet. Similarly, calories are often decreased in restrictive diets, increasing risk for malnutrition and, in some cases, an eating disorder (15,16). Weight loss is not an intended outcome with diets for DGBI and should also be monitored (Table 4). The low-histamine diet has not been evaluated in DGBI but limits protein intake as well as fruits and vegetables, posing other health risks and malnutrition. Diets where nutrients and calories are potentially lower risk may include the Mediterranean diet, which is also widely accessible and has long-term health benefits outside of GI (17).

**Time frame.** Several diets are empirically supported for DGBIs (primarily the low FODMAP diet for IBS) but are not intended to be followed indefinitely. It is important to communicate with your patient about the time frame in which you are expecting them to begin reintroducing foods and liberate their diet. For example, a gluten-free diet may be tried empirically for 4–6 weeks with a motivated, low-risk patient with the expectation that if symptoms are not significantly improved, the patient would reintroduce gluten as part of a balanced diet. Another example is the low FODMAP diet, in which the initial restrictive phase is
and illegal reports worry about the negative consequences of eating certain outcomes to the low FODMAP diet and have higher patient ac-
disease (22). Balanced diet recommendations (e.g., Mediterra-
burden and call for fanatical adherence, using terms such as
diets such as the Mediterranean diet in disorders such as Crohn
ed by the likely improvement in symptoms.

Behavioral and psychosocial risk. One of the most significant
behavioral considerations in dietary intervention is the impact of
food selection and diet on quality of life. Poor food-related quality
of life in individuals with IBS has been associated with higher
levels of food avoidance (including the use of elimination diets)
(18) and diminished nutrient quality (19,20). Furthermore, based
on data in patients with celiac disease, a gluten-free diet may put
some patients at risk for greater anxiety and somatization (21).

It is important to consider a patient’s goals and lifestyle to
determine whether the impact on emotional and psychological
well-being is justified by the likely improvement in symptoms.
For example, some common diets, such as the specific carbohy-
drate diet, impose significant patient emotional and financial
burden and call for fanatical adherence, using terms such as “legal
and illegal” foods—all this despite not outperforming more liberal
diets such as the Mediterranean diet in disorders such as Crohn’s
disease (22). Balanced diet recommendations (e.g., Mediterrane-
and diet and NICE guidelines) have actually shown similar
outcomes to the low FODMAP diet and have higher patient ac-
tability (23–25). More worrisome is a patient who already
reports worry about the negative consequences of eating certain
foods or amounts, avoids eating-related situations, avoids foods
that they want to be able to eat, or find it difficult to be flexible with
eating (e.g., avoid eating before driving) may be particularly
negatively affected by a restricted diet, or worse, at risk for de-
veloping an eating disorder.

Recognizing risk for disordered eating: behavioral and nutritional
assessment before and after prescribing a dietary intervention
There is increasing recognition of the importance of screening for
and preventing the development of maladaptive dietary restric-
tion in patients with DGBI. In particular, a subset of patients
may have dietary restriction (reduced volume, frequency, and/or
variety) that crosses the eating disorder threshold as avoidant/
restrictive food intake disorder (ARFID) (26,27) (Figure 2). Diet
approaches for DGBI may in fact be a risk factor for ARFID, with
one study showing that patients with DGBI with a history of using
a diet were more than 3 times as likely to have ARFID symp-
toms (16).

Dietary restriction in ARFID is motivated by 1 or more rea-
sons that is not related to body image—fear of aversive conse-
quences (e.g., abdominal pain and diarrhea), lack of interest in
eating/low appetite, and/or sensory sensitivity (e.g., taste, texture,
and smell) (28). To be diagnosed with ARFID, patients must have
psychosocial (e.g., difficulty with social eating) and/or medical
(e.g., weight loss and nutrient deficiency) consequences of dietary

Table 1. Psychological considerations for food allergy and sensitivity testing

| Test                | Description                                                                 | Anticipated impact on patient diet                                                                 | Expectations for positive or negative test results                                                                 | Helpful phrases                                                                 |
|---------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Oral food challenge | Gold standard for food allergy testing in the setting of true food allergy symptoms. | Foods identified as true allergies should be avoided.                                             | Positive test suggests true allergy if allergy symptoms are present and can help exclude true food allergy if negative. | “This test is recommended to evaluate for food allergies. However, it is not as helpful to evaluate food sensitivities. For food sensitivity evaluation, guided dietary interventions are often very effective.” |
| Skin prick test     | Indicates the presence of IgE antibody. 95% sensitivity and 50% specificity (i.e., 50% false positives) (37). Not appropriate to evaluate food sensitivities. | Foods identified as true allergies should be avoided.                                             | Positive test suggests true allergy if allergy symptoms are present and can help exclude true food allergy if negative. | “Positive test does NOT indicate true allergy, particularly in the absence of true allergy symptoms.” |
| Serum IgE testing   | Alternative for oral food challenge in the setting of allergy symptoms. Quantifies amount of IgE to specific allergens. Not appropriate to evaluate food sensitivities. | Foods identified as true allergies should be avoided.                                             | Positive test suggests true allergy if allergy symptoms are present, and a negative test can help exclude true food allergy. | “We are still working to understand the role of testing for food sensitivities and intolerances. We know patients with DGBI commonly experience food sensitivities, but we are not yet at the point in our science where these tests are better than what we can offer with a guided dietary intervention. Our approach is to move you from assessment to treatment, with the goal of improving your GI symptoms.” |
| Serum IgG testing   | Quantified amount of IgG to specific food allergens. Little utility to diagnose food hypersensitivities and intolerances due to low test specificity. Evaluates the response of leukocytes when exposed to food extracts. Little utility to diagnose food hypersensitivities and intolerances due to low test specificity and poor reproducibility. | Patients should NOT avoid foods based on IgG testing alone, particularly if true food allergy symptoms are not present. | Positive test does NOT indicate true allergy, particularly in the absence of true allergy symptoms. | “This test is recommended to evaluate for food allergies. However, it is not as helpful to evaluate food sensitivities. For food sensitivity evaluation, guided dietary interventions are often very effective.” |
| ALCAT               | ALCAT, Antigen Leukocyte Antibody Test; DGBI, degrees of expert guidance; GI, gastrointestinal. | Patients should NOT avoid foods based on ALCAT testing alone, particularly if true food allergy symptoms are not present. | Positive test does NOT indicate true allergy, particularly in the absence of true allergy symptoms. | “This test is recommended to evaluate for food allergies. However, it is not as helpful to evaluate food sensitivities. For food sensitivity evaluation, guided dietary interventions are often very effective.” |

Entire table adapted from Birch K, Pearson-Shaver AL. Allergy Testing. StatPearls. Treasure Island, FL, 2021.
| Diet                      | Targeted foods                                                                 | Allowed foods                                                                 | Behavioral considerations                                                                                                                                                                                                 | Nutrients at risk                                                                 | Recommended time frame          | Nutritional risk grade |
|---------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------|------------------------|
| Dairy-free (DF)           | Cow’s milk and all dairy by products: ghee, butter, yogurt, milk, and cheese.   | Vegan dairy alternatives such as soy, hemp, nut and coconut yogurts, cheeses, and liquid milk alternatives.                                                                                                                | Dairy-free is often combined with gluten-free when patients initiate diet change. Often lactose, not dairy proteins are triggers for GI symptoms in DGBI. This level of restriction is more extensive than many GI patients require for symptom improvement. Because dairy protein and gluten are in many food staples, avoidance requires significant lifestyle change. | B vitamins including folic acid, iodine, B6, thiamin, and riboflavin. In addition, protein, calcium, vitamin D, and vitamin A. | Can be short-term proof of concept (4–6 wk) or lifelong. Quarterly meeting with dietitian recommended to assess nutrient adequacy. Supplemental calcium and vitamin D and fortified foods are encouraged. | Moderate                |
| Autoimmune protocol diet (AIP) | Eliminates gluten, dairy, eggs, soy, nightshades, and grains; initially recommended for IBD but more popularly used among patients with DGBI seeking to reduce inflammation. | Lean proteins, produce, nuts and seeds, healthy fats, and other mammalian milks such as goat-derived and sheep-derived products.                                                                                           | Advocated for use in autoimmune conditions. Limited outcomes data on indications and efficacy. Necessity to rely on home-cooked meals with little flexibility because of the number and breadth of food group avoidance increasing risk of ARFID. | Calories, fiber, B vitamins, trace minerals including magnesium and zinc, and vitamin D. Fortified dairy products are a major source of protein, calcium, and vitamin D in the American diet for adults and children. More modest dietary alterations such as limiting lactose can conserve nutrient density and reduce behavioral risk associated with food group avoidance. | Intended to be short term for 4–6 wk with gradual reintroduction of food groups and amounts to evaluate tolerance. Needs to be performed under direction of a dietitian to ensure adequate nutrition. | High                    |
| Specific Carbohydrate Diet (SCD) | Grain-free diet restricting the use of foods containing disaccharides and polysaccharides including some fruits, dairy, legumes, potatoes, and nuts initially. | Proteins, fats and butter, highly fermented yogurt, fruits and some soaked and processed legumes, and tree nuts.                                                                                                           | Largely used to treat IBD vs DGBI, but patients with DGBI may seek out. Advocates call for fanatical adherence with the use of “legal” and “illegal” foods. Does not seem to outperform a Mediterranean style of eating to treat IBD. High risk for ARFID because of the sweeping nature of food group restriction and the number of food rules to properly execute. | Folate, thiamin, B6, vitamin D, vitamins A &D, calcium, fiber, and calories. Whole grains help provide quality nutrients and calories. Removing grains requires substantial calorie shuffling to meet needs. Careful work with GI dietitians to ensure key macronutrient and micronutrient needs are met. | Recommended short time frame to manage symptoms. Long-term safety and efficacy of grain-free diet not been studied in DGBI. | High                    |
| Elemental                 | Removal of all solid foods. Prescribed, liquid elemental formula used for 100% oral enteral nutrition which can be consumed orally or through enteral feeding tube. | 100% oral enteral nutrition delivered by specialized, hydrolyzed amino acid-based formula.                                                                                                       | Elemental formulas have good proximal bowel absorption and can be used in patients with IBS with SIBO. Not routinely recommended and requires close medical and nutritional supervision. Widely advocated in popular media over medical centers. Currently, no transition diet. All liquid diets can have physical and emotional side effects because of the removal of solid foods and out-of-pocket payment for specialized elemental formula. | Greater than 1L formula needed to meet dietary reference intakes for micronutrients. Variability among brands where routine fortification of essential vitamins, minerals, and electrolytes is not mandated. Both macronutrient and micronutrient needs should be managed by registered dietitians. | Intended for short-term use: 4–6 wk and in cases of severe malabsorption or food allergies. No data on safety or efficacy in DGBI or in SIBO as therapeutic diet options. | Exceptional              |
| Diet                        | Targeted foods                                                                 | Allowed foods                                                                 | Behavioral considerations                                                                 | Nutrients at risk                                                                 | Recommended time frame | Nutritional risk grade |
|----------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------|-----------------------|
| The Plant Paradox          | Removal of foods rich in lecithin, a protein found in plant-based foods and whole grains boasting, improved absorption and reduced inflammation. Avoidance of grains, legumes, nuts & seeds, as well as nightsides recommended. | Protein, wild game and fish, healthy fats, low-lactose dairy made from sheep or goat or A2 milk, coconut fats, small amounts of berries, and nonstarchy vegetables. | Diet can be very low in carbohydrates and severely limits food groups. There are several layers of food rules with this protocol. Improvement in symptoms may be due to restricting carbohydrates, fiber or fructans, and other behavioral factors such as weight loss. High risk for restricted eating and ARFID because of the sweeping nature of food group restriction and the number of food rules to properly execute. | B vitamins, fiber, calories, calcium, and vitamin D. In addition, exposure to higher levels of saturated fat intake because of favorable consumption of red meat and high-fat foods. Risk of overt dietary restriction. | This approach is billed as lifestyle change with supplements intended to improve digestion of lectins with progressive addition of some foods. | High                  |
| Whole 30                   | Grain-free, dairy-free, sugar-free, preservative-free, and alcohol-free diet. Follow for 30 days with targeted food reintroduction to test for “triggers” and reset body clock. | Protein, fats (both plant and animal), unlimited fruits, vegetables, and roots. Mostly homemade foods included. | “Rules” of diet support strict adherence for 30 days or participants start over. Diet quality likely improves, but diet can be rich in fructose and saturated fat. Caution with IBS. No clinical trials evaluating outcomes or food-related quality of life in GI patients. | B vitamins (given restriction of whole grains), calcium, vitamin D, carbohydrates, and calories. Potentially excess fructose exacerbating some patients with DGBI. | Typical intervention is 30 days with slow addition of dairy products and grains reintroduced into diet. Diet not recommended for patients with DBGI over other evidence-based approaches. | Moderate-high         |
| Low-histamine diet         | Limiting foods which are rich in histamine such as fermented foods, canned meats and fish, spinach, avocado, and dried fruits. | Fresh meats, poultry, fish, gluten-free grains, pasteurized, nonaged dairy, and fresh fruits and vegetables. Pickled and fermented foods are typically avoided. | Specific foods within each food group are limited so may not be appropriate for those with limited diet or limited resources for fresh food. Low FODMAP diet may also reduce histamine and difficult to discern if major driver of histamine response is food or metabolome. | Not systematically evaluated however can result in reduced protein intake and limited fruits and vegetables. Given reduced gluten, B vitamins and iron are potentially at risk depending on dietary balance. | Short term for 4–6 wk. Recommended to be completed under the direction of GI dietitian to ensure nutrient substitution vs restriction and is not feasible long term. | Moderate              |

This table describes a selection of diets currently popularized as diets to control GI symptoms or overall health. These diets do not have evidence based for DGBI, and we recommend high caution around their use. However, popular diets may be commonly self-initiated by patients and thus are important for the GI provider to be aware of.

ARFID, avoidant/restrictive food intake disorder; DGBI, disorders of gut-brain interaction; GI, gastrointestinal; IBD, inflammatory bowel diseases; IBS, irritable bowel syndrome; SIBO, small intestinal bacterial overgrowth.
The diet with the most evidence exists for the low FODMAP for IBS, but emerging evidence suggests traditional dietary advice delivers comparable results with the low FODMAP diet. Diet approaches such as the NICE guidelines and the Mediterranean diet are less restrictive, allowing easier implementation with lower nutritional and behavioral risks. However, research on diets for DGBI other than IBS is extremely limited.

The American Journal of GASTROENTEROLOGY

VOLUME 117 | JUNE 2022  www.amjgastro.com

**Table 3. Psychological and nutritional considerations for evidence-based diets that are medically prescribed for or self-initiated by patients with DGBI**

| Diet | Targeted foods | Allowed foods | Behavioral considerations | Nutrients at risk | Recommended time frame | Nutritional risk grade |
|------|----------------|---------------|--------------------------|------------------|-----------------------|-----------------------|
| Low FODMAP | Fermentable carbohydrates: lactose-rich dairy, high-fructose fruits and corn syrup, and fructans including wheat, onions, garlic, and legumes, as well as polyol-rich foods. | Protein-rich foods, moderate fructose and fruits and vegetables, low lactose dairy, gluten-free grains, and precise amounts of some legumes and nuts. | Substitution diet vs elimination diet with emphasis on 3 phases: elimination, reintroduction, and personalization. Reported efficacy under the direction of trained dietitian. | Calcium, vitamin D, fiber, and total calories without properly designed meal plans. | Initial phase of the diet recommended for 4–6 wk. Reintroduction can last 3–6 additional months. Goal is to have the least restrictive and most effective dietary pattern when finished with systematic reintroduction. Known efficacy for IBS performed under the direction of GI dietitian. | Moderate |
| Gluten-free (GF) | Gluten-containing grains: wheat, barley, rye, and conventionally processed oats. | Gluten-free grains and carbohydrates including root vegetables, rice, corn meal, teff, millet, amaranth among other nonwheat grains, pulses, and seeds. | In DGBI, reduced fructan load vs exclusive avoidance may be the adequate level of restriction to increase hypervigilance around eating. | Gluten-containing grains in the United States are fortified with iron and B vitamins while many gluten-free versions are not. Using fortified foods and monitored supplement use is advised. | Can be short-term proof of concept (4–6 wk) or lifelong. Meeting with dietitians quarterly is recommended to assess nutrient adequacy and possibility of liberalization in the context of DGBI. | Moderate |
| Mediterranean Diet | Limited in saturated fats, refined carbohydrates, beef, excess sugars, and processed foods. | Focus on plant-based fats and protein. Intentional increase in fruits, vegetables, whole grains, legumes, and seeds. Antioxidant content of diet high because of well-balanced nutrient and fiber matrix with suggested limits on processed foods and added sugars. | Widespread accessibility food options. The Mediterranean style of eating also benefits other chronic diseases such as cardiovascular disease, mental health, and diabetes allowing for a total wellness approach. Patients would benefit from working with dietitians to help execute meal planning and lifestyle changes. | Limited nutrient risk with balanced, plant-based Mediterranean style of eating. If dairy consumption is low, additional vitamin D is likely beneficial from fortified foods or monitored supplements. Ensure adequate calories, protein, and variety. | Meant as lifestyle change with focus on healthy dietary patterns. | Limited |
| National Institute for Health and Clinical Excellence (UK NICE GUIDELINES) | Scheduled meals with adequate healthy foods and fiber. Focus on limiting fructose by limiting portions of fruits to 3 servings/day and limiting resistant starch and wheat bran vs gluten. | Wide variety of foods and no foods are disallowed. Focus on eating behaviors and types of foods consumed with limits versus avoidance. | Limited risk given the recommendation to focus on dose of trigger foods versus avoidance. Patients often benefit from working with dietitians to help implement diet and lifestyle modifications. | Little risk for nutrient imbalance. Public health resources emphasize balanced, fiber-rich foods. General wellness and healthy lifestyle advice for patients with IBS. | Recommendations suggest identifying patterns and thresholds for some trigger foods such as resistance starch and fructose. Consistent with general health and lifestyle recommendations and can be implemented lifelong. | Limited |

**Notes:**
- DGBI, disorders of gut-brain interaction; GI, gastrointestinal; IBS, irritable bowel syndrome.
- The diet with the most evidence exists for the low FODMAP for IBS, but emerging evidence suggests traditional dietary advice delivers comparable results with the low FODMAP diet. (e.g., NICE guidelines). Gluten-free diets have some evidence for IBS but do not outperform the low FODMAP diet. Diet approaches such as the NICE guidelines and the Mediterranean diet are less restrictive, allowing easier implementation with lower nutritional and behavioral risks. However, research on diets for DGBI other than IBS is extremely limited.
Table 4. Behavioral and nutritional assessment examples to consider before and after prescribing a dietary intervention for patients with DGBI

| Consideration               | Example assessment question(s)                                                                 | Red flags\(^b\)                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Quality-of-life impact      | Do eating or food decisions get in the way of your ability to live the life you would like to? | Patient reports worry about the negative consequences of eating certain foods or amounts that leads them to avoid eating-related situations, avoid many food types that they want to be able to eat, or develop eating inflexibility (e.g., avoid eating before driving). |
| Eating-related distress     | How much time, mental energy, and effort do you spend around eating and food choices?         | Patient reports desire to spend less time thinking about and preparing food and/or thinking about food/eating takes away from concentrating on tasks they are engaged in (e.g., conversations, reading, and work). |
| Weight suppression\(^a\)    | Have you lost weight as a result of your GI symptoms? [If yes: what was your usual weight range prior to losing weight?] Have you had difficulty gaining weight as a result of your GI symptoms? | Unintentional body weight loss of • 5% over 1 mo • 7.5% over 3 months • 10% over 6 month |
| Dietary restriction         | Over the past month, could you give me an example of what a typical day of eating has looked like for you—starting off with the time you first eat and an example and then going throughout the day? | Dietary restriction for frequency (e.g., >6 waking hours without eating) and/or caloric intake that is associated with any: • Medical consequences: o weight loss o difficulty gaining weight o nutrient deficiencies o dependence on nutritional supplements o other physical markers potentially associated with poor nutrition (e.g., fatigue) • Quality-of-life impairments (e.g., social eating difficulty) |
| Food avoidance              | **Before dietary prescription** Over the past month, have you avoided certain foods or had difficulty eating enough, for example, because of worry about having negative physical symptoms or forgetting to eat? Or because of strict rules about what foods you should and should not eat? **After dietary prescription** Have you been able to reintroduce most of the foods you tried eliminating? | Patient reports any of the following: • Lack of diet diversity (e.g., only eating a few foods) • Elimination of food groups without substitution of replacement foods • Restrictive eating behaviors including only eating home-cooked food • Relying on liquid supplementation • Self-directed diet changes without clear symptom benefit Decreased food intake variety that is associated with any: • Medical consequences: o weight loss o difficulty gaining weight o nutrient deficiencies o dependence on nutritional supplements o other physical markers potentially associated with poor nutrition (e.g., fatigue) • Quality-of-life impairments (e.g., social eating difficulty) |

These assessment markers presume that structural causes for dietary limitations have been ruled out. If any red flag is present, providers should consider a diet with limited risk (Table 3) or refrain from diet prescription. DGBI, disorders of gut-brain interaction; GI, gastrointestinal.

\(^a\)Even if the patient's current weight is in the “normal” range for their age/sex, it is not necessarily a marker of health. Significant weight loss can have detrimental consequences including bone mineral density loss. When available, the patient's weight graphs in the medical chart can be used; this is especially important in the pediatric setting.

\(^b\)Noted red flag recommendations for adults.

Restriction (26,29). Symptoms of ARFID have been reported in 13%–40% of patients with disorders of gut-brain interaction (19,27), with rates as high as 48% in IBS specifically (27). The most common motivation for ARFID restriction has been a fear of GI symptoms and occurs in individuals of all ages (30).

To identify the presence of problematic dietary restriction, we recommend providers to screen before and after dietary prescription for psychosocial and medical impacts of dietary restriction (Table 4). There are emerging self-report survey screening options for ARFID (31), but these have not yet been validated to detect ARFID in DGBI. There are no validated methods for ARFID prevention in patients with DGBI. However, before dietary prescription, providers can talk with their patients about the rates of ARFID in DGBI, how dietary restrictions are temporary (when applicable), and that the end goal is for the patient to have a nutritionally balanced diet and a flexible relationship with food.
Clinical pearl #2: managing the patient interested in or on a fad diet

Below are some red flags for fad (or popular) diets that include strict and dogmatic approaches to limiting whole food groups to improve symptoms. See Table 4 for additional guidance.

1. Popular diets (Table 2) can overpromise physiologic benefits and may involve sophisticated rituals related to eating and cooking. Often there is theoretical evidence without studies showing safety and efficacy.

2. Patients with DGBI are often interested in integrating both conventional medical care and complementary approaches such as herbal therapies, dietary modifications, and other supplements.

3. Social media personalities who experienced “amazing results” can be powerful influencers for patients wanting relief. Undoubtedly, popular diets can drive both physical and psychological harm to patients because of the perception that stricter adherence equals better results. This subsequently sets the stage for problematic cognitive/emotional (e.g., guilt or fear around eating) and behavioral (e.g., binge eating or social eating avoidance) outcomes, which negatively affect functioning and/or nutritional status.

4. Patients will often seek approval and/or guidance from medical providers on their approach. Clinicians can steer patients away from the more dangerous elements of popular diets by validating the role of food intolerances in DGBI and by reassuring that less restrictive, evidence-based approaches have been well studied and do produce favorable results in many.

5. Involving a dietitian allows the focus to be on what patients can eat versus what they “cannot.” The nutritional goal is always to provide the least restrictive and most varied diet modification which minimizes symptoms and optimizes diet quality.

6. Dismissive counseling or shaming patients for exploring alternatives jeopardizes dynamic communication between patient and provider.

Other eating disorders are also relevant when selecting a dietary approach for DGBI. Some patients may have a history of an eating disorder and are recovered—strict elimination diets are typically contraindicated as a risk for relapse (9). Other patients may have current cognitive (e.g., significant body image disturbance) and/or behavioral (e.g., binge eating, self-induced vomiting, and excessive exercise) manifestations of eating disorders beyond dietary restriction—elimination diets are also typically contraindicated in these cases (9). Importantly, eating disorders affect individuals of all demographics and weight status (not just those with a low weight) (32). Because the psychological effects of some dietary prescriptions for IBS can detrimentally perpetuate an eating disorder, we recommend that screening for current eating disorder symptoms should be considered for all patients with DGBI. Notably, the presence of current eating disorder symptoms does not preclude the use of dietary interventions for DGBI symptoms—modifed dietary prescriptions (e.g., FODMAP “light”) can be made—and the inclusion of a multidisciplinary team is crucial (e.g., dietician monitoring + psychologist providing evidence-based eating disorder treatment). More information on assessment and treatment guidelines for eating disorders can be found in the Academy for Eating Disorders Medical Care Standards (33). A recommended short screening option is the SCOFF (34), which can be administered through clinician questioning or as a survey.

For comprehensive guidelines on identifying and managing ARFID and other eating disorders, see the work of Lemly et al. (35) and the Academy for Eating Disorders guidelines (36).

Developing a pathway for low-resource patients to access safe dietary interventions when appropriate

Although the importance of a RD in the oversight of dietary interventions, particularly those who involve dietary restriction, cannot be overstated, we recognize that access to such services is often limited. Many patients also choose to follow dietary interventions on their own, with little guidance from professionals. Before recommending more sophisticated forms of nutritional therapy, clinicians need to consider the food environment including access to food and specialty foods as well as willingness and ability to cook. Religious and personal food practices such as...
vegetarianism may affect the level of dietary advice recommended. Adequate nutrition coverage for medical nutrition therapy in DGBI may influence whether patients ultimately work with a dietician. With a recent partnership between the American Gastroenterological Association (AGA) and the AND practice group, dietitians in GI disorders aim to provide GI disease-specific information for GI clinicians and a network of GI-trained RD for clinical and research needs. In addition, GI providers looking to integrate a RD with limited GI experience can sponsor specialized training through one of these resources.

CONCLUSION
In this brief report, we described some of the psychological considerations influencing the choice of dietary interventions in the management of DGBI, emphasizing the importance of the gastroenterology provider in helping patients make informed decisions that consider not only nutritional and behavioral risk but also quality of life.

ACKNOWLEDGMENTS
We thank Ms. Sydney Phlegar for her administrative support on this project.

CONFLICTS OF INTEREST
Guarantor of article: Laurie Keefer, PhD.
Specific author contributions: H.B.M., B.D., K.H., and L.K. all contributed to the choice of content, structure, and overall development of the manuscript draft and reviewed the final version of the document.
Potential competing interests: H.B.M.: receives royalties from Oxford University Press for her forthcoming book on rumination syndrome. B.D.: is on the scientific advisory board of Trellus Health and is a consultant to Reckitt Health. K.H.: no relevant disclosures or COI. L.K.: is a consultant to Abbvie, Eli Lilly, Reckitt Health, and Trellus Health. She is an equity owner Trellus Health and on the Board of Directors for the Rome Foundation. L.K. receives royalties from Routledge for her edited book *Handbook of Psychogastroenterology*.
Financial support: This work was supported in part by the National Institute of Diabetes and Digestive and Kidney Diseases—K23 DK131334 (H.B.M.).

Study Highlights

**WHAT IS KNOWN**

- Dietary interventions are commonly used in the management of disorders of gut-brain interaction with varying degrees of expert guidance (DGBI).
- Maladaptive eating behaviors and eating disorders, including avoidant/restrictive food intake disorder, are common among patients with DGBI.

**WHAT IS NEW HERE**

- Dietary interventions and food allergy testing should be considered in the context of psychological risk factors.
- Practical recommendations for the gastrointestinal provider around identifying risk and managing expectations for patients with DGBI on or interested in dietary intervention.

REFERENCES

1. Chey WD, Keefer L, Whelan K, et al. Behavioral and diet therapies in integrated care for patients with irritable bowel syndrome. Gastroenterology 2021;160(1):47–62.
2. Dionne J, Ford AC, Yuan Y, et al. A systematic review and meta-analysis evaluating the efficacy of a gluten-free diet and a low FODMAPs diet in treating symptoms of irritable bowel syndrome. Am J Gastroenterol 2018;113(9):1290–300.
3. Black CJ, Staudacher HM, Ford AC. Efficacy of a low FODMAP diet in irritable bowel syndrome: Systematic review and network meta-analysis. Gut. Published online August 10, 2021 (doi: 10.1136/gutjnl-2021-325214).
4. Wang J, Yang P, Zhang L, et al. A low-FODMAP diet improves the global symptoms and bowel habits of adult IBS patients: A systematic review and meta-analysis. Front Nutr 2021;8:683191.
5. Staudacher HM, Rossi M, Kaminski T, et al. Long-term personalized low FODMAP diet improves symptoms and maintains luminal Bifidobacteria abundance in irritable bowel syndrome. Neurogastroenterol Motil 2022;34(4):e14241.
6. Prospero L, Riezzo G, Linsalata M, et al. Psychological and gastrointestinal symptoms of patients with irritable bowel syndrome undergoing a low-FODMAP diet: The role of the intestinal barrier. Nutrients 2021;13(7):2469.
7. Rej A, Aziz I, Sanders DS. Personalizing dietary therapies for irritable bowel syndrome: What is gluten’s role?. Clin Gastroenterol Hepatol 2021;19(11):2270–3.
8. Haller E, Scarlata K. Diet interventions for irritable bowel syndrome: Separating the wheat from the chafe. Gastroenterol Clin North Am 2021;50(3):565–79.
9. Scarlata K, Catsos P, Smith J. From a dietitian’s perspective, diets for irritable bowel syndrome are not one size fits all. Clin Gastroenterol Hepatol 2020;18(3):543–5.
10. Bacal LR. The impact of food allergies on quality of life. Pediatr Ann 2013;42(7):141–5.
11. Ravid NL, Annunziato RA, Ambrose MA, et al. Mental health and quality-of-life concerns related to the burden of food allergy. Psychiatr Clin North Am 2015;38(1):77–89.
12. Teufel M, Biedermann T, Rapps N, et al. Psychological burden of food allergy. World J Gastroenterol 2007;13(25):3456–65.
13. Jansson SA, Heibert-Arnlin M, Middelveld RJ, et al. Health-related quality of life, assessed with a disease-specific questionnaire, in Swedish adults suffering from well-diagnosed food allergy to staple foods. Clin Transl Allergy 2013;3:21.
14. Hammond C, Lieberman JA. Unproven diagnostic tests for food allergy. Immunol Allergy Clin North Am 2018;38(1):153–63.
15. Mari A, Hosadurg D, Martin L, et al. Adherence with a low-FODMAP diet in irritable bowel syndrome: Are eating disorders the missing link? Eur J Gastroenterol Hepatol 2019;31(2):178–82.
16. Atkins M, Zar-Kessler C, Madva E, et al. Prevalence of exclusion diets and relationship with avoidant/restrictive food intake disorder in adult and pediatric neurogastroenterology patients, unpublished data.
17. Martínez-Iacobra R, Pardo-Garcia I, Amo-Saus E, et al. Mediterranean diet and health outcomes: A systematic meta-review. Eur J Public Health 2018;28(5):955–61.
18. Guadagnoli N, Mutlu EA, Doerfler B, et al. Food-related quality of life in patients with inflammatory bowel disease and irritable bowel syndrome. Qual Life Res 2019;28(8):2195–205.
19. Murray HB, Staller K. When food moves from friend to foe: Why avoidant/restrictive food intake matters in irritable bowel syndrome. Clin Gastroenterol Hepatol. Published online September 20, 2021 (doi: 10.1016/j.cgh.2021.09.017).
20. Melchior C, Algera J, Colombier E, et al. Food avoidance and restriction in irritable bowel syndrome: Relevance for symptoms, quality of life and nutrient intake. Clin Gastroenterol Hepatol. Published online July 3, 2021 (doi: 10.1016/j.cgh.2021.07.004).
21. Mazzzone L, Reale I, Spina M, et al. Compliant gluten-free children with celiac disease: An evaluation of psychological distress. BMC Pediatr 2011;11:46.
22. Lewis JD, Sandler RS, Brotherton C, et al. A randomized trial comparing a carbohydrate diet to a Mediterranean diet in adults with Crohn’s disease. Gastroenterology 2021;161(3):837–e9.
23. Rej A, Aziz I, Sanders DS. Personalizing dietary therapies for irritable bowel syndrome: What is Gluten’s role?. Clin Gastroenterol Hepatol 2021;19(11):2270–273.
24. Eswaran SL, Chey WD, Han-Markey T, et al. A randomized controlled trial comparing the low FODMAP diet vs. Modified NICE guidelines in US adults with IBS-D. Am J Gastroenterol 2016;111(12):1824–32.

25. Paduano D, Cingolani A, Tanda E, et al. Effect of three diets (low-FODMAP, gluten-free and balanced) on irritable bowel syndrome symptoms and health-related quality of life. Nutrients 2019;11(7):1566.

26. Harshman SG, Jo J, Kuhnle M, et al. A moving target: How we define avoidant/restrictive food intake disorder can double its prevalence. J Clin Psychiatry 2021;82(5):20m13831.

27. Murray HB, Bailey AP, Keshishian AC, et al. Prevalence and characteristics of avoidant/restrictive food intake disorder in adult neurogastroenterology patients. Clin Gastroenterol Hepatol 2020;18(9):1995–e1.

28. Thomas JJ, Lawson EA, Micali N, et al. Avoidant/restrictive food intake disorder: A three-dimensional model of neurobiology with implications for etiology and treatment. Curr Psychiatry Rep 2017;19(8):54.

29. American Psychological Association AP. Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Arlington, VA: American Psychiatric Publishing; 2013.

30. Fink M, Simons M, Tomasino K, et al. When is patient behavior indicative of avoidant restrictive food intake disorder (ARFID) vs reasonable response to digestive disease? Clin Gastroenterol Hepatol. Published online August 5, 2021 (doi: 10.1016/j.cgh.2021.07.045).

31. Burton Murray H, Dreier MJ, Zickgraf HF, et al. Validation of the nine item ARFID screen (NIAS) subscales for distinguishing ARFID presentations and screening for ARFID. Int J Eat Disord 2021;54(10):1782–92.

32. Schaumberg K, Welch E, Breithaupt L, et al. The science behind the Academy for eating disorders’ nine truths about eating disorders. Eur Eat Disord Rev 2017;25(6):432–50.

33. Guide AJEDMC. Eating Disorders: A Guide to Medical Care. Academy for Eating Disorders: Reston, VA, 2021. Contract No.: Committee Guide.

34. Morgan JF, Reid F, Lacey JH. The SCOFF questionnaire: Assessment of a new screening tool for eating disorders. BMJ 1999;319(7223):1467–8.

35. Lemly DC, Dreier MJ, Birnbaum S, et al. Caring for adults with eating disorders in primary care. Prim Care Companion CNS Disord 2022;24(1):20nr02887.

36. Mehler PS, Andersen AE. Eating Disorders: A Guide to Medical Care and Complications: Johns Hopkins University Press; 2017.

37. Birch K, Pearson-Shaver AL. Allergy Testing. StatPearls: Treasure Island, FL, 2021.

This is an open access article distributed under the Creative Commons Attribution License 4.0 (CCBY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.