Navigating Gluten-Related Health Disorders and Nutritional Considerations of Gluten-Free Diets

Leslie A. Gaillard

There are myriad reasons why individuals choose to follow a gluten-free diet, which continues to be a pervasive nutrition trend. This commentary includes a discussion of the most common reasons that patients choose gluten-free foods, including celiac disease and non-celiac gluten sensitivity.

According to the market research firm Mintel, nearly 38% of those who choose gluten-free foods cite improved health as a reason [1]. People who do not have celiac disease are driving the greatest amount of market growth, with 82% of consumers choosing gluten-free products for reasons other than being diagnosed with celiac disease [1]. While individuals with celiac disease must follow a strict and lifelong gluten-free diet, others choose to embark on this diet for a variety of reasons: weight loss, other perceived health benefits, and reduction of symptoms associated with gastrointestinal conditions including irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD). Regardless of the reasons for excluding gluten from one's diet, there are important nutritional considerations to examine when following such a plan.

Celiac disease is an inherited autoimmune disease that is estimated to affect 1 out of every 133 asymptomatic people [2]. When a person with celiac disease consumes gluten—a protein found in wheat, rye, barley, and their derivatives—it causes damage to the absorptive villi of the duodenum, which leads to malabsorption of important nutrients. A diagnosis of celiac disease is made by testing the patient's blood for antibodies; the preferred test is a tissue transglutaminase (tTG) antibody test. This testing is generally followed by a small-bowel biopsy demonstrating villous blunting and atrophy in the small intestine.

The symptoms of celiac disease are vast and affect many different organs. These symptoms include gastrointestinal complaints (diarrhea, constipation, bloating, and flatulence), elevated liver enzyme levels, nutritional deficiencies (iron, B-12, and fat-soluble vitamins), infertility, skin rashes, osteoporosis, neurological impairments, and failure to thrive in children. The average time to diagnosis for an individual with celiac disease is 4 years [3]. Increased delays in diagnosing celiac disease can lead to complications including the development of other autoimmune diseases such as thyroid disease, osteoporosis, and cancer. Even celiac disease patients who do present with gastrointestinal symptoms may be given a differential diagnosis such as IBS or lactose intolerance. According to a study conducted in the United Kingdom, up to 28% of people with celiac disease were originally treated for IBS before being correctly diagnosed [4].

Non-celiac gluten sensitivity (NCGS) differs from celiac disease in that there are no available biomarkers to confirm the diagnosis. This condition does not produce positive tTG antibodies, nor does it cause damage to the small intestine or nutrient malabsorption. Upon small-bowel biopsy, there is no evidence of villous atrophy or increased epithelial lymphocytes in these patients.

Similar to some patients with celiac disease, those with NCGS may report gastrointestinal distress such as diarrhea, constipation, bloating, or flatulence. The severity of patients' symptoms may correlate with the quantity and regularity of gluten consumption. In contrast to celiac disease, however, cross-contamination of foods with small amounts of gluten is not a concern for those with NCGS.

In general practice, a diagnosis of NCGS may be made after exclusion of other disorders, a clinical evaluation showing symptom improvement during a gluten elimination diet, and the ability to reproduce symptoms during a subsequent gluten challenge. During the gluten elimination phase, the patient eliminates major sources of gluten from his or her diet for a 2–6-week period. Symptoms should be carefully monitored during this exclusion period, and no other changes should be made to the diet or medication regimen. Then the patient is carefully guided through a systematic reintroduction of gluten-containing foods while monitoring for any change in symptoms. Kabbani and colleagues developed a diagnostic algorithm to distinguish NCGS from celiac disease. Patients are likely to have NCGS if they have negative celiac disease antibody testing and also lack signs of

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Address correspondence to Ms. Leslie A. Gaillard, 156 Mine Lake Ct, Ste 100, Raleigh, NC 27615 (leslie@lgnutrition.com).

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malabsorption and celiac disease risk factors (eg, decreased bone mineral density or micronutrient deficiencies) [5].

A potential confounder in confirming NCGS is a possible sensitivity to other food components. For example, highly fermentable carbohydrate sources have been suggested as a possible etiology for symptoms in some patients who experience altered bowel function, as in the case of both IBS and IBD [6]. Fructans are a category of fermentable carbohydrate that includes gluten-containing grains (wheat, rye, and barley) as well other foods such as onions, garlic, and chicory root. Thus, some patients may feel that their symptoms improve solely because of gluten removal, when in reality a larger array of foods may be responsible for their symptoms.

A dietary approach described with the acronym FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) involves an extensive food elimination diet that withdraws highly fermentable carbohydrate sources (including fructans) that can produce gastrointestinal symptoms of diarrhea, constipation, gas, and bloating in sensitive individuals. Individuals who have IBS or IBD may benefit from minimizing consumption of a larger range of fermentable carbohydrate sources, including lactose, fructose, fructans, galacto-oligosaccharies, and polyols. The FODMAP diet has been found to decrease symptoms of functional bowel disorders in some individuals by as much as 75% [7]. However, this approach may lead to no improvement in symptoms in others.

Following a gluten-free diet is essential for those with celiac disease and potentially helpful for those with other digestive concerns. Others may choose to follow a gluten-free diet in an attempt to lose weight or to make healthier food choices. However, there is no evidence-based data to suggest that a gluten-free diet is an effective method to promote weight loss [8]. In fact, weight gain and obesity are possible nutritional consequences of adopting a gluten-free diet. This is due in part to the higher calorie content of many gluten-free commercial foods. Among those with celiac disease, weight gain is often associated with the healing process, as healing improves absorption of macro- and micronutrients in the small intestine.

If not properly planned, withdrawing gluten from one's diet can lead to potential nutrient gaps. Patients with celiac disease should be screened for nutrient deficiencies at the time of diagnosis. Common deficiencies among celiac disease patients include iron, B vitamins, magnesium, calcium, and fat-soluble vitamins (A, D, E, and K).

Because wheat is commonly enriched with B vitamins (thiamin, riboflavin, niacin, and folic acid), a gluten-free diet can be marginally lower in B vitamins. Patients may not be aware that the gluten-free versions of breads, pastas, cereals, and crackers are generally not fortified with B vitamins. These gluten-free substitute items may also be made with grains that are lower in fiber, such as white rice or potato flour, which could contribute to potential issues with constipation. Patients should rotate their intake of gluten-free whole grains to include brown rice, quinoa, buckwheat, teff, amaranth, and certified gluten-free oats. Intake of gluten-free products fortified with nutrients such as B vitamins, calcium, and vitamin D should also be encouraged [9]. There are also many naturally gluten-free starches that can augment the diet with important nutrients, including sweet potatoes, butternut or acorn squash, beans, and lentils.

Patients with celiac disease are at increased risk of decreased bone mineral density due to malabsorption, and some individuals with celiac disease or NCGS may also have lactose intolerance, which may directly impact their calcium intake. Patients who are lactose intolerant can opt for dairy products low in lactose, such as hard aged cheeses (cheddar, Swiss, or Parmesan) and Greek yogurt, or they can purchase products with added lactase enzymes. Dark green leafy vegetables such as kale, spinach, broccoli, and collard greens—as well as nuts and seeds—are also good non-dairy sources of calcium.

There is the misconception that gluten-free products are healthier than their gluten-containing counterparts. While much depends on the individual product, it is not uncommon for gluten-free snacks and convenience foods to be more calorie-dense and to have fewer nutrients. The calorie, fat, and carbohydrate content of gluten-free snacks and convenience foods can vary significantly from their gluten-containing counterparts; this is due to the addition of fats and sugars and the blending of multiple gluten-free flours to achieve optimal taste and texture. Thus, reading labels is imperative to ensure a healthy diet intake, in addition to weight management and optimal blood sugar control among those with diabetes. Consultation with a registered dietitian who has experience with gluten-free diets and food sensitivities is recommended to ensure a well-balanced intake.

The gluten-free nutrition trend continues to be popular and widespread. The majority of individuals who are following a gluten-free diet are doing so for reasons other than celiac disease. Those with NCGS may feel that removing gluten from their diet helps to control their gastrointestinal symptoms. While there may be validity to the patient's conclusion, it is imperative that other underlying medical causes be carefully evaluated—including other possible food sensitivities, such as sensitivity to fermentable sources of carbohydrates—before reaching this diagnosis. NCMJ

Leslie A. Gaillard, MPH, RD/LDN nutrition counselor, LG Nutrition, Raleigh, North Carolina.

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