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When Gluten Becomes the Enemy: Understanding Celiac Disease

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Bread, chapati, biscuits, cakes and other wheat-based foods are part of everyday meals for millions of people; these wheat-based foods contain a protein called "gluten". Individuals with celiac disease consuming these gluten-containing foods can trigger an abnormal immune response that damages the small intestine. What makes this condition challenging is that its symptoms are not always limited to the digestive system. Sometimes, persistent tiredness, anaemia, poor growth in children, bone problems or unexplained nutritional deficiencies may be the first warning signs. Celiac disease is a chronic, immune-mediated enteropathy triggered by dietary gluten in genetically predisposed individuals, leading to damage of the small intestine and impaired nutrient absorption. This disorder develops in genetically susceptible individuals when they consume gluten, naturally present in wheat, barley and rye. The immune system reacts abnormally to gluten and damages the lining of the small intestine, interfering with the absorption of essential nutrients. Although the condition can develop at any age, early recognition and appropriate dietary management are important for preventing complications.

Changes inside the body

The small intestine contains numerous tiny, finger-like projections called *villi*. These structures increase the surface area available for absorbing nutrients from food. In people with active celiac disease, the immune response to gluten causes inflammation and damage to the villi leading to a condition known as villous atrophy. When the intestinal lining is damaged, the body may not absorb adequate quantities of nutrients such as iron, folate, vitamin B12, calcium and other essential vitamins and minerals. Consequently, a person may develop anaemia, fatigue, weight loss, weakened bones or growth problems despite consuming sufficient food. Celiac disease is not just a digestive disorder or a food intolerance. It is an autoimmune condition requiring appropriate medical diagnosis and long-term management.

How common is celiac disease?

Celiac disease is a global health concern, although its prevalence varies across geographical regions, global seroprevalence of approximately 1.4%, while biopsy-confirmed prevalence is approximately 0.7%. Seroprevalence refers to the proportion of people with positive disease-related antibody tests; biopsy-confirmed prevalence refers to cases established through examination of intestinal tissue. India also shows regional differences. A pan-India study involving 23,331 healthy adults, as reported in the presentation, found a seroprevalence of 1.23% in northern India, 0.87% in northeastern India and 0.10% in southern India. Differences in dietary patterns, particularly wheat consumption, may contribute to regional variation, although they do not fully explain the differences.

How does celiac disease develop?

Celiac disease develops through an interaction between genetic susceptibility and exposure to gluten.

Genetic susceptibility: Certain genetic variants, particularly HLA-DQ2 and HLA-DQ8, are strongly associated with celiac disease. The condition can occur in families and individuals with an affected close relative may have a higher risk. However, possessing these genetic variants does not mean that a person will necessarily develop the disease.

Gluten exposure: In genetically susceptible individuals, consuming gluten can activate an abnormal immune response. This response damages the intestinal lining and reduces nutrient absorption.

Other contributing factors: The onset of the disease may coincide with events such as infections, surgery or pregnancy. However, these associations do not establish that such events directly cause celiac disease in every individual. The precise reasons why some genetically susceptible people develop the condition while others do not remain an area of research. It is also important to distinguish celiac disease from wheat allergy and non-celiac gluten sensitivity. Wheat allergy involves an allergic immune response to wheat proteins, whereas non-celiac gluten sensitivity can produce similar symptoms without the characteristic intestinal damage of celiac disease. These conditions require different approaches to diagnosis and management.

Symptoms in adults

Adults may experience diarrhoea, constipation, abdominal discomfort, excessive gas and bloating. However, digestive symptoms are not always prominent. Other possible manifestations include unexplained iron-deficiency anaemia, persistent fatigue, mouth ulcers, joint or bone pain, skin problems and neurological complaints. Some individuals may experience anxiety, depressive symptoms or difficulties with concentration and memory. These symptoms are not specific to celiac disease and can occur in many other conditions. Nevertheless, persistent or unexplained symptoms warrant medical assessment, particularly when several warning signs occur together.

Celiac disease affects more than the digestive system

The effects of celiac disease extend beyond the intestine because nutrients are essential for the normal functioning of the entire body.

Anaemia and nutritional deficiencies: Iron deficiency is particularly important because iron absorption can be impaired by intestinal damage. Folate and vitamin B12 deficiencies may also contribute to anaemia in some patients.

Bone health: Poor absorption of calcium and vitamin D can adversely affect bone mineralisation, increasing the risk of osteopenia and osteoporosis.

Skin and neurological manifestations: Some people develop dermatitis herpetiformis, an intensely itchy skin condition associated with celiac disease. Neurological manifestations, including peripheral neuropathy and problems with balance or coordination, may also occur.

Reproductive health: Untreated disease has been associated with reproductive difficulties and adverse pregnancy outcomes in some individuals.

Psychological well-being: Persistent symptoms, nutritional deficiencies and the demands of maintaining a strict gluten-free diet can affect emotional well-being and social participation. Psychological symptoms should be assessed appropriately rather than assumed to be caused solely by celiac disease.

What happens if celiac disease remains untreated?

Continued gluten exposure in a person with celiac disease can sustain intestinal inflammation and interfere with nutritional recovery. Potential complications include persistent anaemia, malnutrition, impaired growth in children, reduced bone density and certain neurological or reproductive problems.

Celiac disease is also associated with an increased risk of some other autoimmune conditions, including autoimmune thyroid disease and type 1 diabetes. In a small proportion of patients, longstanding or complicated disease can be associated with serious intestinal conditions, including enteropathy-associated T-cell lymphoma. These complications do not develop in every patient. Their possibility nevertheless reinforces the importance of timely diagnosis, appropriate treatment and continued medical follow-up.

Diagnosis of celiac disease: Diagnosis of celiac disease involves clinical assessment and appropriate investigations. Blood tests, particularly tissue transglutaminase IgA (tTG-IgA), along with total IgA levels, are used commonly for initial screening. In adults, an intestinal biopsy may be performed to identify characteristic damage to the small intestine, while HLA-DQ2 and HLA-DQ8 genetic testing can help clarify uncertain cases. Individuals should not begin a gluten-free diet before completing the recommended diagnostic tests, as avoiding gluten can affect the results and make accurate diagnosis difficult.

A lifelong gluten-free diet: The cornerstone of management

At present, the established treatment for celiac disease is a strict, lifelong gluten-free diet. This means avoiding foods containing wheat, barley and rye, along with products contaminated by these grains. In India, dietary planning requires particular attention because wheat-based foods such as chapati, roti, bread, biscuits and many bakery products are widely consumed. Naturally gluten-free alternatives include rice, maize, jowar, bajra, ragi, millets, pulses, fruits, vegetables, milk, eggs, meat and fish, provided the products are suitable and have not been contaminated with gluten during processing or preparation. Oats are naturally gluten-free but may be contaminated with wheat, barley or rye during processing. People with celiac disease should therefore choose appropriately labelled gluten-free oats and discuss their suitability with their healthcare professional.

Beware of hidden gluten

Gluten may be present in unexpected products, including certain processed foods, sauces, seasonings, bakery products and packaged snacks. Food labels should be checked carefully, and people should be aware of cross-contact during food preparation. For example, using the same utensils, cooking surfaces or containers for gluten-containing and gluten-free foods can introduce contamination. Families, hostels, restaurants and institutional kitchens all have an important role in providing safe meals. A gluten-free diet should not consist mainly of expensive packaged products or highly refined starches. Rice, millets, pulses, vegetables, fruits, nuts and other suitable foods can contribute to a balanced dietary pattern. People with newly diagnosed celiac disease may require assessment for iron, folate, vitamin B12, vitamin D and other nutritional deficiencies. Supplements should be prescribed according to individual needs rather than taken indiscriminately.

Conclusion

Celiac disease is a lifelong condition, but early diagnosis and appropriate management can substantially improve health and quality of life. Its symptoms may resemble common digestive complaints, while its effects can extend to blood health, bones, growth, metabolism and psychological well-being. The message is clear: a gluten-free diet is a medical necessity for people with confirmed celiac disease, not a universal health recommendation for everyone. Unnecessary gluten restriction can complicate diagnosis and may reduce dietary variety if meals are not planned well. With accurate information, timely diagnosis, balanced gluten-free nutrition and regular follow-up, people with celiac disease can protect their health and lead active, fulfilling lives.

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