

Celiac Disease in Women

Description/Etiology

Celiac disease (CD; also known as celiac sprue and gluten-sensitive enteropathy) is a chronic autoimmune disease induced by ingestion of food products containing gluten, a protein found in wheat, rye, and barley. CD is caused by an autoimmune reaction to gluten in due to unknown environmental factors in individuals who are genetically susceptible (due to the presence of HLA-DQ2 and/or HLA-DQ8 haplotype). Tissue transglutaminase (tTG), an enzyme that modifies gluten, is the major autoantigen in CD. In patients with CD, ingestion of gluten results in an inappropriate immune response that causes atrophy of the villi in the small intestine resulting in diarrhea and malabsorption of nutrients; the CNS, skin, joints, and reproductive system may also be affected.

Although CD is often diagnosed in infants after the introduction of cereal in their diet, the majority of persons with CD are diagnosed in later childhood or in adulthood due to the presence of subtle signs and symptoms (e.g., anemia, chronic fatigue, arthralgia, intermittent diarrhea). Adults often have signs and symptoms of CD for up to 10 years before diagnosis and are commonly misdiagnosed with irritable bowel syndrome. Serology tests with the highest accuracy for diagnosing CD are immunoglobulin A (IgA), endomysial antibody (EMA), and IgA tTG antibody. Abnormal histology of biopsied small bowel tissue confirms the CD diagnosis.

Women with undiagnosed and untreated CD can experience numerous gynecologic and obstetric abnormalities and bone mineral loss and are at increased risk for fracture. They often present with minimal GI signs and symptoms but instead present with iron deficiency anemia, fatigue, migraine headaches, and/or depression. Delayed puberty, amenorrhea, infertility, and early menopause are common. The nutritional deficiencies due to malabsorption that are characteristic of CD increase the risk of fetal abnormalities if a woman with CD becomes pregnant, including risk of low birth weight and intrauterine growth restriction. CD is associated with increased risk of adverse pregnancy outcomes, including miscarriage and preterm labor. Infertility due to undiagnosed CD can shorten the number of child-bearing years.

Prognosis is excellent if patients eat a strict gluten-free diet (GFD; i.e., eating no wheat, rye, barley, or oats that are not certified gluten-free [as they may be cross-contaminated in growing fields]) and if levels of IgA tTG and IgA EMA are undetectable after adopting a GFD for 6–12 months. Patients with a nutritional deficiency may require treatment with multivitamin, iron, and/or calcium supplementation. The elevated risk of infertility, miscarriage, and low birth weight resolves after 1 year on a GFD. Treatment includes patient and family education about CD and dietary restrictions, emotional support, and lifelong medical surveillance. Unrelieved CD signs and symptoms are usually related to lack of strict patient adherence to the prescribed dietary regimen.

Facts and Figures

CD is most common in persons of northern European descent with a prevalence of 1 in 250 to 1 in 100 depending on the specific population. It affects twice as many females as males.

Author

Cherie Marcel, BS

Cinahl Information Systems, Glendale, CA

Reviewers

Darlene Strayer, RN, MBA

Cinahl Information Systems, Glendale, CA

Helle Heering, RN, CRRN

Cinahl Information Systems, Glendale, CA

Nursing Practice Council

Glendale Adventist Medical Center,
Glendale, CA

Editor

Diane Hanson, MM, BSN, RN, FNAP

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Risk Factors

CD onset may be triggered by surgery, pregnancy, childbirth, infection (e.g., with rotavirus, *Campylobacter* spp. or reovirus), or severe emotional stress. CD is more common in persons with diabetes mellitus, type 1 (DM1) and certain genetic disorders, including Down syndrome and Turner syndrome (i.e., a genetic disorder occurring only in females when the patient's cells are missing all or part of an X chromosome). Small for gestational age and elective cesarian birth may be risk factors for CD.

Signs and Symptoms/Clinical Presentation

Women with CD may present with GI signs and symptoms, fatigue, anemia, delayed puberty, amenorrhea, infertility, and/or osteoporosis.

Nutritional Assessment

› Patient Medical History

- Take a complete medical history; ask about the following:
 - Family history of CD
 - Medical conditions (e.g., thyroid disorder, diabetes mellitus, other autoimmune disorders, or renal failure)
 - Onset, duration, and severity of signs and symptoms that can have a negative impact on adequate dietary intake(e.g., vomiting/diarrhea/constipation, pain, fatigue, headaches)
 - Recent unexpected weight loss
 - Level and type of regular physical activity

› Physical Findings of Particular Interest

- Patients may show signs of malabsorption (e.g., pallor, muscle wasting, easy bruising)
- Abdominal distention and hyperactive bowel sounds may be present
- Skin examination may identify papulovesicular pruritic rash on elbows, knees, trunk, and neck due to dermatitis herpetiformis

› Patient Dietary History

- Conduct a diet analysis by asking the patient to complete a diet history (specifically assess for adequate nutrient intake consumption of gluten-containing foods)
 - Useful tools for evaluating the patient's dietary strengths and weaknesses include a food-frequency questionnaire and a 3-day diet recall (i.e., patient recall of all foods and beverages consumed in a 3-day period) that includes 1 weekend day
- Ask about personal habits, including alcohol, caffeine, and soda consumption; smoking; eating at night; and frequenting vending machines or fast food
- Assess for anxiety and depression, which can interfere with dietary intake and compliance with the GFD

› Anthropometric Data

- Calculate the patient's BMI by dividing body weight (kilograms) by height (meters squared); or 703 multiplied by weight (pounds) and divided by height (inches squared)
 - Underweight: Below 18.5; **normal: 18.5–24.9**; overweight: 25–29.9; obese: greater than or equal to 30
 - In patients over 65 years of age, evidence suggests that a slightly higher BMI (25–27) may help prevent bone deterioration and is associated with a lower risk of mortality
 - In some cases, body composition testing (e.g., dual-energyX-ray absorptiometry scan, skin calipers) may be necessary

› Laboratory and Diagnostic Tests of Particular Interest to the Nutritionist

- Positive serologic antibody tests for IgA tTG and IgA EMA have a 90% sensitivity and 95% specificity for diagnosing CD
- Blood tests may be ordered to evaluate for malabsorption; low levels of iron, folate, calcium, and fat-soluble vitamins (i.e., A, D, E, K) may indicate CD
- Histologic examination of biopsied small bowel tissue will show flattening of the mucosa and atrophy of the villi in patients with CD. A normal test result excludes the diagnosis

Treatment Goals

› Relieve CD Manifestations and Promote Optimal Nutritional Status

- Review results of laboratory tests and diagnostic studies used to assess for or monitor complications; and report nutritional status-related findings to the treating clinician as they are obtained
- Evaluate for gastrointestinal discomfort (e.g., nausea/vomiting/diarrhea/constipation) and adjust dietary recommendations accordingly

› Educate Regarding Diagnosis and Treatment and Promote Emotional Well-Being

- Assess patient/family anxiety level, coping ability, and level of family support for making the prescribed dietary changes; provide emotional support, educate, and encourage discussion on the importance of eating a gluten-free diet, if ordered
- Provide detailed education on following a gluten-free diet, including
 - eating a GFD high in nutritional value
 - meal planning
 - shopping for food
 - taking supplemental vitamins, iron, and calcium
 - reading labels on medications, supplements, and foods for information on ingredients and additives, as all can contain gluten
- Request referral to a social worker for identification of resources for local support groups; provide online sources of information, including CD dietary guides at <http://www.celiac.com/> or <https://www.gluten.org/>

Food for Thought

- › Although CD is thought to be associated with increased risk of infertility, authors of a recent systematic review and meta-analysis concluded that prevalence of CD is not higher in women with infertility than in the general population (Glimberg et al., 2021)
- › Researchers in a study of 14,513,587 births in the United States found that women with CD were 4.5 times more likely to develop hyperemesis gravidarum, 7.6 times more likely to develop *Clostridioides difficile* colitis, and 2.9 times more likely to experience venous thromboembolic events. In addition, infants born to women with CD were 1.8 times more likely to be growth restricted and 3.5 times more likely to have congenital malformations (Elliott et al., 2021)
- › Practitioners should consider all of the factors that affect their patients' abilities to manage CD in their everyday lives in order to provide adequate support and help patients adopt effective coping strategies

Red Flags

- › Monitor for signs and symptoms of other autoimmune diseases that frequently occur in patients with CD (e.g., DM1, autoimmune thyroiditis, dermatitis herpetiformis)
- › Risk of developing osteoporosis is high in patients with untreated CD
- › Women with CD may be at increased risk of developing eating disorders

What Do I Need to Tell the Patient/Patient's Family?

- › Emphasize the importance of lifelong adherence to a GFD and continued medical surveillance
- › Advise the patient to eat a diet that is high in fiber and low in fat that includes fish and other lean sources of protein, complex gluten-free carbohydrates, and a variety of fruits and vegetables
- › Encourage attending a support group for contact with others who face similar health challenges
- › Educate that with strict adherence to a gluten-free diet a healthy pregnancy is possible

Discharge Planning

- › Eat a calorie-appropriate GFD that includes food sources rich in calcium, vitamin D, and iron; fish and other lean proteins; unsaturated fats; gluten-free complex carbohydrates; and a variety of fruits and vegetables
 - Calcium-rich foods include dairy products, leafy green vegetables, dried beans, and soybeans
 - Vitamin D-rich foods include fatty fish, beans, nuts, eggs, fortified milk, and cheese
 - Iron-rich foods include organ meats, beef, chicken, fish, shellfish, beans, and green leafy vegetables
 - Eat small, frequent meals with nutrient-dense foods for better tolerance and energy maintenance
 - Choose high-fiber foods and drink adequate water to prevent or relieve constipation
 - › Take dietary supplements as prescribed
 - › Participate in daily physical activity. Exercise reduces stress hormones, increases the sense of well-being, improves sleep, and improves overall health
 - › Recruit the help of family and friends to assist in meal planning, grocery shopping, and food preparation
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