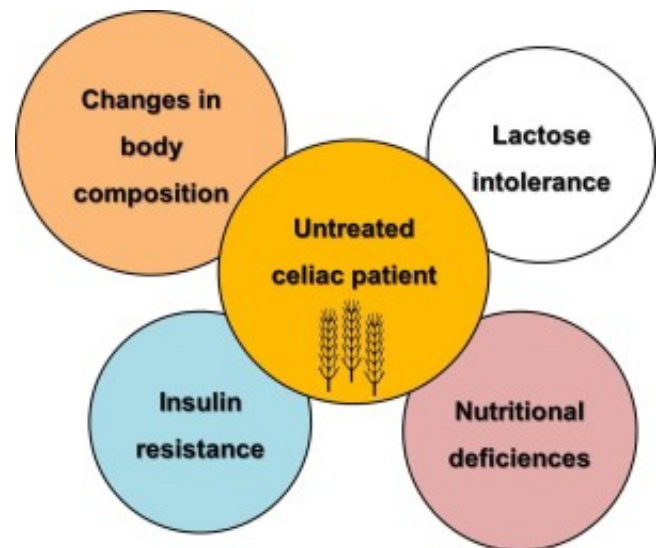


Celiac disease and nutrition

Celiac disease (CD) is a chronic, immune-mediated enteropathy of the small bowel mucosa, induced by dietary gluten in genetically pre-disposed individuals. It is characterized by intestinal malabsorption and subtotal or total atrophy of intestinal villi, which improves after gluten-free diet (GFD). Gluten is a general term for insoluble prolamine polypeptides found in wheat (gliadins and glutenins), rye (secalin), barley (hordein) and other closely-related grains. Unlike wheat, rye and barley, oats have been shown to be non-immunogenic in most individuals with CD. Gluten-induced small intestinal mucosa injury will eventually reduce the intestinal absorptive area and interfere with the uptake of micronutrients. The prevalence of CD in the general population is reported to be around 1%. Our aim was to describe nutritional changes in untreated adult celiac patients, and we found many interesting data in literature.



The predominant consequence of CD in untreated patients, is malnutrition as a result of malabsorption. Moreover, several and increasing extra-intestinal clinical manifestations have been described in the CD patients. In particular, vitamin deficiencies may aggravate retinopathy (vitamin A), systemic and peripheral neuropathy (vitamins B12 and E), complications of pregnancy (iron and folic acid deficiency), dental disease, osteopenia, and osteoporosis (vitamin D). Deficient intake and absorption of calcium and vitamin D, and the development of secondary hyperparathyroidism should be present in the patients with osteoporosis, and several studies have shown that osteopenia occurs in adult CD patients. However, the degree of recovery due to the nutrients malabsorption is dependent on age at onset, extent and duration of the condition and other concomitant health factors.

With regard to the lipid metabolism in the CD patients, an alteration in lipid metabolism can occur in disorders of the small gut mucosa, as a consequence of lipid malabsorption and decreased intake. Lactose intolerance, increased in the CD patients, both due to an impaired secretion of trypsin, a

pancreatic enzyme that activates the lactase, and to the intestinal villous brush border damage where lactase is located, may have a role in reduced sources of calcium. Iron deficiency primarily results in the CD patients, with consequent iron-deficiency anemia, for its impaired absorption as a result of the villous atrophy of the intestinal mucosa. Finally, insulin resistance related to intestinal malabsorption and a higher glycemic index of gluten-free products, was been reported.

Strict adherence to a GFD improves nutritional status, inducing an increase in fat and bone compartments, but does not completely normalize body composition and nutritional deficiencies.

Evidence has shown lower body weights and lower fat mass and fat-free mass contents in CD patients. Untreated CD patients oxidize more carbohydrates as energy substrate compared to treated subjects. In addition, hormonal changes were reported. In order to perform a correct evaluation of nutritional status and metabolic requirements, it should be necessary to measure body weight components, i.e. fat mass (FM) and fat-free mass (FFM), total body water and to evaluate energy expenditure and nutrient utilization. Body composition can be assessed either by simple and easy-to-perform methods, such as anthropometry, skinfold thickness and biochemical measurements or by very sophisticated techniques, such as computed tomography and magnetic resonance imaging. These latest are also used to measure the visceral fat depots, by using a single scan at the lumbar level. Very expensive techniques for body composition measurement such as isotopic dilution into water compartments or adipose cells, neutron activation analysis, computed tomography and magnetic resonance imaging need well-trained staff and are so far performed only in highly specialized centers. The most commonly used techniques to assess body composition in clinical practice are: anthropometry and skinfold thickness measurement; bioimpedance analysis; dual-energy x-ray absorptiometry (DXA).

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Publication

[Nutritional profile of adult patients with celiac disease.](#)

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Eur Rev Med Pharmacol Sci. 2015 Nov