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The Spanish Journal of Gastroenterology

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DOI: 10.17235/reed.2019.5251/2017
Link: PubMed (Epub ahead of print)

Please cite this article as:
Parada Alejandra C., Méndez Constanza, Aguirre Carolina. Excess weight and gastrointestinal symptoms in Chilean celiac patients at the time of diagnosis. Rev Esp Enferm Dig 2019. doi: 10.17235/reed.2019.5251/2017.

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OR 5251 inglés

Excess weight and gastrointestinal symptoms in Chilean celiac patients at the time of diagnosis

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Received: 02/10/2017

Accepted: 18/03/2018

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ABSTRACT

Introduction: celiac disease is an immune condition that results in histologic changes in the small bowel and produces both digestive and extra-digestive symptoms. Intestinal damage results in malabsorption and impaired weight or impaired optimal weight gain. However, these patients may be overweight or obese in spite of histologic damage. The aim of this study was to determine the prevalence of excess weight in newly diagnosed (adult) celiac patients.

Methods: this was a retrospective observational study of patients recently diagnosed with celiac disease according to the standard Marsh classification. Nutritional status was assessed based on body mass index (BMI), as categorized by the World Health Organization (WHO). Clinical presentation was classified as typical or atypical. Potential differences in gastrointestinal symptoms according to nutritional status were also

assessed.

Results: a total of 135 medical records of adult celiac patients (women = 123; men = 12) were reviewed. The average weight and BMI were 61.1 kg and 23.7 kg/m^2, respectively. The proportion of typical clinical presentations was 59.2% and of atypical presentations 40.8%. A total of 71.8% of patients had a BMI indicating low or normal weight and 28.1% had a BMI indicative of being overweight or obese. No differences with regard to the presence of gastrointestinal symptoms were found according to nutritional status.

Conclusions: further studies are needed to jointly assess energy intake and intestinal absorption in these patients, in order to explain the high rate of excess weight.

Key words: Celiac disease. Obesity. Nutritional status.

INTRODUCTION

Celiac disease (CD) is a chronic immune intestinal disorder with a strong genetic component that is triggered by gluten ingestion (1). The prevalence is now recognized to be higher than previously estimated and atypical clinical presentations have been identified. This has contributed to an improved understanding and recognition of the disease (2-4). CD occurs with two different clinical presentations, so-called typical and atypical. Typical or classical CD is characterized by gastrointestinal symptoms attributable to gluten ingestion, which results in malabsorption manifested as diarrhea, steatorrhea, growth failure and malnutrition or malabsorption syndrome (4). Asymptomatic or atypical CD is characterized by an absence of malabsorption symptoms and the presence of extra-intestinal manifestations such as liver dysfunction and herpetiform dermatitis, among others (4-6).

Multiple studies describe the shift in nutritional status experienced by celiac patients after adhering to a gluten-free diet (GFD). This suggests the potential causal role of the nutritional properties of gluten-free food and highlights the improvement of the enteric condition after adhering to treatment (7). However, obesity has not only been diagnosed in celiac patients on GFD but an increased rate has also been observed among newly

diagnosed individuals.

Furse et al. reported four cases of newly diagnosed CD in patients who were obese, with body mass index (BMI) values above 38 kg/m^2 and classic diarrhea symptoms suggestive of malabsorption (8). A number of explanations have currently been proposed. Murray et al. proposed the hypothesis that micronutrient deficiencies resulting from villous atrophy-related malabsorption may trigger a predilection for specific foods, much in the same way as the pica cases reported in celiac children with iron deficiency (9,10). However, this was reported back in 1990 and no additional cases have been reported since then.

Evidence thus far advises that a CD diagnosis should not be excluded due to nutritional status; celiac disease should be considered regardless of BMI. No data have been reported in Chile of the nutritional status of celiac patients. Therefore, the goal of our study was to assess the prevalence of excess weight in newly diagnosed adult celiac patients seen at Red de Salud Christus UC. Potential differences in clinical presentation according to nutritional status were also assessed.

MATERIAL AND METHODS

This was an observational, retrospective study that reviewed medical records of adult patients newly diagnosed with celiac disease, which was confirmed using the Marsh-Oberhuber classification (11). The cases had started a gluten-free diet (GFD) and had first visited a nutritional practice within the past ten years. Pregnancy was considered as an exclusion criterion and the study was approved by the Ethics Committee of the Medical School, Pontificia Universidad Católica, Chile.

Clinical presentation

The OSLO 2013 (12) criteria were used to classify the clinical presentation. Subjects with gastrointestinal symptoms attributable to gluten ingestion were categorized as symptomatic patients, whereas cases with no symptoms commonly associated with CD or in response to gluten ingestion or withdrawal were categorized as asymptomatic patients. These cases are usually diagnosed by screening programs or in individuals at risk of CD.

Nutritional status

Weight and height at diagnosis were recorded in order to estimate and classify BMI. BMI was categorized according to the World Health Organization (WHO) criteria (13) as follows: low weight < 18.5 kg/m^2, normal weight = 18.5 to 24.9 kg/m^2, overweight ≥ 25-29.9 kg/m^2 and obesity ≥ 30 kg/m^2.

Histology

Histological morphology in the duodenal biopsy specimen was classified according to the Marsh-Oberhuber criteria (11) as follows:

- Type 0: normal.
- Type 1: normal architecture and increased intraepithelial lymphocytes ≥ 40/100 enterocytes.
- Type 2: normal architecture, increased intraepithelial lymphocytes ≥ 40/100 enterocytes and crypt hyperplasia.
- Type 3a: partial villous atrophy, mild crypt hyperplasia, villus/crypt ratio < 3:1.
- Type 3b: subtotal villous atrophy, crypt hyperplasia.
- Type 3c: complete villous atrophy, crypt hyperplasia.
- Type 4: Hypoplasia.

Statistics

Data for all patients included are expressed as an average or proportions. Nutritional status was considered as a dependent variable whereas gastrointestinal symptoms were considered as an independent variable. Groups were compared using the Chi-square test for categorical variables. Statistical significance was set at $p \leq 0.05$. Statistical analyses were performed using the Stata 10.1 software package.

RESULTS

A total of 203 medical records were reviewed of celiac patients seen at the nutritional clinic, UC-Christus health network, from 2004 to 2016. Of these, 135 subjects were selected who met all the inclusion criteria with complete records. Average weight and BMI was 61.1 kg and 23.7 kg/m^2, respectively. The mean age was 40.6 years and 91.1% of the sample were female. Table 1 shows the general characteristics of the group.

The sample was split in two groups for analysis, according to nutritional status. Group 1 included patients with a BMI indicative of low or normal weight and group 2 included patients with a BMI indicative of being overweight or obese. Group 1 represented 71.9% of the sample and group 2 represented 28.1%. Table 2 shows the gastrointestinal symptoms according to nutritional status. No differences were found with regard to symptom type ($p = 0.88$) or histologic grade ($p = 0.96$) between the groups. In addition, there were no significant differences with regard to gastrointestinal symptom type between the groups.

DISCUSSION

Excess weight was recorded in 28.1% of the Chilean adult celiac patients at the time of diagnosis. This number is similar to that reported for the primary care database in the United Kingdom (14). However, it is lower than that reported by a national survey of the Finnish Coeliac Society (15), the study by Tucker et al. in England (16) and the study performed in a health institution in the USA (17). The prevalence in these studies were 40%, 44% and 32%, respectively. However, our prevalence is higher than that found in a hospital in Naples (Italy) (20.3%) (18) and in the Basque Country (Spain) (7.4%) (19). When compared to the findings obtained by the Chilean National Health Survey 2010, this group of celiac patients had a lower rate of excess weight, as 70% of Chilean healthy adults were overweight or obese (20).

While malabsorption symptoms such as diarrhea and weight loss may be less common among overweight and obese patients, the rate of typical celiac symptoms was similar in both groups (group 1 *vs* group 2). Few intestinal absorption studies are available on these patients. Thus far, only one study found 20% of malabsorption in newly diagnosed

individuals (21). Further studies of intestinal absorption in this population would help to clarify this issue.

The histologic damage induced by CD directly involves nutrient absorption, which results in nutritional status impairment or the presence of gastrointestinal symptoms. However, our study found no differences in histologic damage and clinical presentation according to nutritional status. In this regard, the study by Oso et al. reported similar findings in an obese teenager with CD with recurrent diarrhea, particularly after eating spaghetti (22). A potential explanation would be the compensatory hypothesis, since atrophy results in bowel function loss in celiac patients. This hypothesis suggests the presence of increased absorption in the unscathed portion of the bowel, which would compensate for impaired absorption and contribute to weight gain and obesity in some celiac patients (23). Overweightness and obesity are less commonly reported in the pediatric population with CD. A prevalence of 10% was reported in Italian children with CD (24), whereas a prevalence of 11.5% (25) and 5.8% (26) were found among the Greek and Turkish populations, respectively. In this regard, the compensatory surface area of the intestine may expand with age, which would account for the fact that overweightness and obesity are less common in children as compared to adults. Diamanti et al. further stressed the hypothetical role of intestinal adaptation by association with the clinical presentation of the condition. Younger children, who usually exhibit typical symptoms, would have a lower potential for intestinal adjustment, whereas older children, adolescents and adults would have developed the above adaptive mechanism and would more frequently present with atypical manifestations (24). However, the study did not assess intestinal absorption or the extent of enteropathy.

Our study was limited as it was an observational study and no dietary history or absorption capabilities were considered. These measurements may help to explain the presence of excess malnutrition and are included in a proposal for a future study in celiac patients with active enteropathy. Finally, as not only malnutrition but also excess weight is prevalent in celiac patients, even in the presence of active enteropathy and gastrointestinal symptoms, this should be borne in mind. Hence, management at

diagnosis should also include the maintenance of an adequate nutritional status.

FINANCIAL SUPPORT

The study was supported by *Proyecto FONDECYT Postdoctorado* No. 3120096.

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Table 1. General characteristics of the study patients with celiac disease

Study variable	*Frequency*
Gender (n/%)	
Male	12 (8.9)
Female	123 (91.1)
Age (average-range)	40.6 years (15-70)
Biopsy (Marsh-Oberhuber criteria) (n/%)	
1	0
2	12 (8.9)
3a	30 (22.2)
3b	29 (21.5)
3c	63 (46.6)
4	1 (0.7)
Anti-transglutaminase antibodies	
(average U/ml)	82
Clinical presentation	
Symptomatic (%)	80 (59.2)
Asymptomatic (%)	55 (40.8)
BMI (n/%)	
Low-weight < 18.5	4 (3.0)
18.5-24.9	93 (68.9)
25-29.9	28 (20.7)
30-34.9	9 (6.7)
35-35.9	1 (0.7)
> 40	0 (0)

BMI: body mass index.

Table 2. Prevalence comparison of histologic lesions and gastrointestinal symptoms in celiac patients according to nutritional status

Variable	*Low-weight - Normal-weight (n = 97)*	*Overweight - Obesity (n = 38)*	*p-value*
Histologic lesions (Marsh-Oberhuber criteria) (n/%)			
2	8/8.2	4/10.5	0.96
3a	21/21.6	9/23.6	
3b	21/21.6	8/21.1	
3c	46/4.4	17/47.7	
4	1/1.0	0	
Gastrointestinal symptoms (n/%)			
Diarrhea	52/53.6	20/53.6	0.78
Abdominal pain	49/50.5	57.9/22	0.51
Distension	64/65.9	24/63	0.64
Weight loss	35/36	8/21	0.07
Anemia	16/16.4	12/31.5	0.07
Clinical presentation (n/%)			
Symptomatic	58/59.7	22/57.9	0.88
Asymptomatic	39/40.2	16/42.1	