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Eating habits and nutritional status of patients with celiac disease in South Brazil

Alice **SGANZERLA**¹ and Bruna Bellincanta **NICOLETTO**²

¹ Universidade de Caxias do Sul, Curso de Nutrição, Caxias do Sul, RS, Brasil.

² Universidade de Caxias do Sul, Curso de Nutrição, Área do Conhecimento de Ciências da Vida (VIDA), Caxias do Sul, RS, Brasil.

HIGHLIGHTS

- Most patients with celiac disease from South Brazil do not consume gluten.
- Patients with celiac disease are more careful about gluten cross-contamination in their homes than in restaurants.
- Patients with celiac disease from South Brazil have adopted good eating habits with a balanced gluten-free diet.
- Nutritional status improved after diagnosis of celiac disease according to body mass index.

ABSTRACT – Background – Celiac disease is defined as a chronic autoimmune disease that affects the small intestine in genetically predisposed people, triggered by exposure to gluten. The only treatment for celiac disease to date is a lifelong gluten-free diet. Eating habits of celiacs play an important role in their nutritional status. **Objective** – To evaluate the eating habits and nutritional status of patients with celiac disease in Rio Grande do Sul. **Methods** – This is a cross-sectional study with patients diagnosed with celiac disease residing in Rio Grande do Sul (Brazil) over 18 years of age. An online questionnaire was applied with calls through social networks and also by the *Associação dos Celiacos do Brasil – Rio Grande do Sul Section*. Sociodemographic data, history of celiac disease, general medical history, reported weight and height and food consumption data (SISVAN food frequency questionnaire and general questions) were collected. **Results** – The sample consisted of 142 individuals with a mean age of 39.75±11.5 years, 94.4% were women and 93% were white. The patients showed care regarding a gluten-free diet, with the majority not ingesting gluten (82.2%) and being careful regarding cross-contamination by gluten in their homes (85.9%) and in restaurants (62, 4%). Most patients also had good eating habits, with frequent consumption of fruits, vegetables, meats, eggs and low frequency of processed foods and fats. Body weight before and after the diagnosis of celiac disease did not show significant changes (62.3±13.8 versus 63.6±11.7 kg; $P=0.147$); however, there was an improvement in the classification of nutritional status by body mass index (malnourished: 11.6% before versus 2.3% after; $P=0.016$). **Conclusion** – Most celiac disease patients in this study have good eating habits with a balanced gluten-free diet and improved nutritional status after diagnosis according to body mass index classification.

Keywords – Eating habits; celiac disease; gluten-free diet; nutritional status.

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Corresponding author: Bruna Bellincanta Nicoletto. E-mail: bbngehrke@ucs.br



INTRODUCTION

Celiac disease (CD) is a chronic, autoimmune disease that affects the small intestine in genetically predisposed people, triggered by gluten exposition⁽¹⁾. It is estimated that 1% of the world's population is affected by CD⁽²⁾. The common CD presentation changed from the classic symptoms of bad absorption during infancy to non-classic symptoms, which may be present during childhood or during adulthood⁽³⁾.

To this moment, the only treatment for CD is a strict gluten-free lifelong diet. Gluten is found on wheat, barley, rye and products that contain those⁽⁴⁾. Even when a gluten-free diet is followed, complete gluten avoidance can be difficult due to cross contamination⁽⁵⁾. Also, nutritional deficiencies occur due to CD, and have to be corrected. Patients must be advised to a fiber rich diet, complemented with whole rice, corn, potatoes and many vegetables⁽⁴⁾.

However, there is evidence that feeding habits of CD patients are characterized by a low consumption of cereals, fruits and vegetables and an excess consumption of meat and its products^(5,6). The low palatability and high cost of commercial gluten-free products, the increasing usage of gluten-free snacks and high fat content cookies can create inadequate feeding habits on celiac patients⁽⁷⁾. A gluten-free diet must be balanced, matching all the patient's individual energy and nutrition needs, since the exclusion of gluten-free foods may bring about nutritional deficiencies to the patient's diet, which in turn lead to an inadequate nutritional status⁽⁵⁾.

CD diagnoses are on the rise, and weight fluctuations are common after the adoption of a gluten-free diet due to inadequate feeding choices. Literature shows that patients with CD increase their body mass index (BMI) by more than two points after the adoption of a gluten-free diet⁽⁸⁾. In the same manner, women with CD exhibit a larger prevalence of overweight and obesity when compared to non-CD women⁽⁹⁾. Thus, almost half of the adult patients with CD show a BMI over 25 kg/m² at diagnosis, indicating overweight or obesity, contrasting with the classic CD image of a skinny, malnourished patient^(10,11).

In this context, the objective of this study was to evaluate the eating habits and the nutritional status of patients with CD from Rio Grande do Sul.

METHODS

Study design and sample

This is a transversal study, with a convenience sample that includes CD patients that live in Rio Grande do Sul state, Brazil. Study participation calls were published in social media, in web groups and web pages specifically concerning CD. Those invited to participate in the study were individuals diagnosed with CD, living in Rio Grande do Sul, of more than 18 years old and who freely consented to take part in the research. The diagnosis of CD was determined through the patient's reports of serological tests, intestine biopsies or genetic testing and medical diagnosis reports. Patients that did not meet those specific criteria (that is, those less than 18 years old, or with no formal medical diagnosis and test reports or living outside Rio Grande do Sul) were excluded from the study.

This study was approved by the Research Ethics Committee (approval number 5.151.104) of Caxias do Sul University (UCS). Participants received information about the research and were invited to participate, agreeing to this through the Free and Clarified Consent Term through a Google Forms online questionnaire. The research followed the Resolution Number 466/2012 of the National Health Council of the Health Ministry (Brazil), which deals with the Ethics Code for the Research on Human Beings.

Data collection

All project steps were performed in the online form. For data collection, an online form through Google Forms was used, with the link: <https://forms.gle/QNFsaZ3L1rP5pFA5A>.

The calling for research participation had a 2-month duration and was sent and announced through social media (Facebook groups, Whatsapp and Instagram), including CD patients and web pages related to CD. The official web page of the Brazilian Celiac Patients Association - Rio Grande do Sul Section (ACELBRA-RS) also divulged the calling. The Free and Clarified Consent Term was presented previously to the questions in the online form to obtain the patient's consent.

To characterize the sample, sociodemographic data was collected (gender, age, ethnicity, state, city

of residence, schooling and family income). To evaluate the nutritional status, anthropometric data (weight and height) before diagnosis and at the time of research was collected, both reported by the patients themselves through the online questionnaire. The BMI (kg/m²) was calculated from weight and height data, and the values were categorized according to World Health Organization (WHO) criteria⁽¹²⁾. Regarding CD history, questions about diagnosing, CD in the family history, health professional follow-up and gluten-free diet adherence were applied.

Eating habits were evaluated through questions related to allergies, food intolerances, places where meals occurred and gluten cross contamination. A food frequency questionnaire from the Nutritional and Food Vigilance System was also used⁽¹³⁾, to evaluate the food and beverages consumption in the last 7 days. The instrument is composed of 10 food groups, with some being adapted by providing a gluten-free description and the addition of food options like meats, eggs, industrialized, and gluten-free doughs, pizzas, breads, cookies, chips and beer.

Statistical analysis

Data was analyzed through the Statistical Package for Social Sciences software, version 20.0 (SPSS Inc, Chicago, IL). Continuous variables were tested as to the normality through the Shapiro Wilk test. Variables with normal distribution were presented as mean ± standard deviation, and the variables with nonparametric distribution as median (interquartile range). Categorical variables were presented as absolute and percentile numbers. The comparison among anthropometric variables before diagnosis and at research time were performed through the paired t-test for continuous variables and the Wilcoxon test for ordinal categorical variables. The adopted significance level was $P < 0.05$.

RESULTS

A total of 162 patients with CD answered the research participation call. From these, eight individuals were excluded for not having a formal medical diagnosis, eight individuals did not reside in the state of Rio Grande do Sul, two were younger than 18 years old and two individuals did not provide diag-

nosis tests information, adding up to 20 excluded individuals. Thus, 142 individuals were analyzed in this study. From these, 134 (94.4%) are female and 8 (5.6%) are male, of mean age 39.75±11.5 years old. The sample characterization is presented in TABLE 1.

TABLE 1. Sample characteristics.

Variables	Total sample (n=142)
Age, years	39.75±11.5
Gender, n (%)	
Female	134 (94.4)
Male	8 (5.6)
Ethnicity, n (%)	
Caucasian	132 (93.0)
Non-Caucasian	10 (7.0)
Schooling, n (%)	
Incomplete high school	4 (2.8)
Complete high school	21 (14.8)
Incomplete university education	20 (14.1)
Complete university education	35 (24.6)
Post-graduation	62 (43.7)
Family income, n (%)	
Up to 1 minimum wage	4 (2.8)
1–2 minimum wages	19 (13.5)
3–5 minimum wages	56 (39.7)
6–7 minimum wages	17 (12.1)
8 or more minimum wages	30 (21.3)
Prefer not to say	15 (10.6)
Time of diagnosis of celiac disease, years	5 (2–10)
Diagnostic exam, n (%)	
Serological	96 (67.6)
Endoscopy with bowel biopsy	130 (91.5)
Genetic test	26 (18.3)
Relative with celiac disease, n (%)	31 (21.8)
Follow-up with a health professional, n (%)	125 (88.7)
Which health professional, n (%)	
Dietitian	50 (35.2)
Gastroenterologist doctor	114 (80.3)

TABLE 2 shows the patients eating habits, with most (n=117, 82.2%) not eating gluten. However, 24 (16.9%) individuals reported eating gluten occasionally, and, from these, 19 (16.1% of the total) eat gluten with a frequency of 1 time per month or less. Most patients also cook and eat their meals at home, although 67 (47.5%) eat at restaurants which are not

TABLE 2. Eating habits of individuals with celiac disease.

Variables	Total sample (n=142)
Gluten intake, n (%)	
Follow a gluten free diet	117 (82.2)
Did not follow a gluten free diet	1 (0.7)
Sometimes intake gluten	24 (16.9)
Gluten intake frequency, n (%)	
1x / month	19 (16.1)
1x / 15 days	3 (2.5)
1x / week	2 (1.7)
Eat gluten with no restrictions	1 (0.8)
Eat gluten according to medical guidelines	2 (1.7)
Allergy or intolerance, n (%)	
Lactose	24 (44.4)
Allergy to cow's milk protein	7 (13.0)
Place where have meals, n (%)	
Home	134 (94.4)
In restaurants that do not have food for celiacs	7 (4.9)
In the homes of relatives or friends	1 (0.7)
Frequency of meals in places for celiacs, n (%)	
Never	62 (44.0)
1-2 x / month	67 (45.7)
1 x / week	11 (7.8)
2-3 x / week	1 (0.7)
Frequency of meals in places not for celiacs, n (%)	
Never	43 (30.5)
1-2 x / month	67 (47.5)
1 x / week	14 (9.9)
2-3 x / week	9 (6.4)
Everyday	8 (5.7)
Careful about cross-contamination by gluten at homes, n (%)	
Yes	122 (85.9)
No	6 (4.2)
Sometimes	14 (9.9)
Careful about cross-contamination by gluten in restaurants, n (%)	
Yes	88 (62.4)
No	19 (13.5)
Sometimes	34 (24.1)

celiac specific at least 1 or 2 times a month. Most patients in this study (n=122; 85.9%) take precautions to avoid cross contamination at home, but at restaurants this number drops to 88 (62.4%).

Food consumption and its weekly frequency is described in TABLE 3, with most adult patients with CD in this study showing good feeding habits, with the frequent consumption of fruits, legumes, vegetables, meats, eggs and a low consumption of fats and industrialized foods.

The nutritional status of the patients of the study is presented in TABLE 4. There were no significant changes in weight before and after CD diagnosis (62.3 ± 13.8 kg versus 63.6 ± 11.7 kg; $P=0.147$), and, as a consequence, there was significant change in BMI either (23.3 ± 4.7 kg/m² versus 23.8 ± 3.8 kg/m²; $P=0.114$). However, there was significance in the changes of the categories of the BMI ($P=0.016$), with improvements in the nutritional status classification (TABLE 4).

DISCUSSION

In this study 142 individuals with CD living in the state of Rio Grande do Sul (Brazil) were evaluated. In this sample, most participants are Caucasian, women and of high income and schooling. Good eating habits and an improvement in the categories of nutritional status of the patients after the diagnosis of CD were observed.

The population of the research is mainly composed of women (94.4%), overwhelming male participation (5.6%). This can be attributed by a greater self-care of women. Data by the Brazilian Institute of Geography and Statistics (IBGE) shows, in a study performed in the last 12 months, that 78% of the women had consulted with a physician at least once, compared to 63.9% of men in the same period⁽¹⁴⁾. Besides that, a research by ACELBRA-SC (state of Santa Catarina) observed a greater incidence of CD in women, 68% versus 32%. In this same study, 95% of the individuals were Caucasian⁽¹⁵⁾. Similar data found in other research corroborate these observations, showing Caucasian women as making up the most part of the CD patient population^(16,17), the same as this study, that showed 93% Caucasians. Literature does not elucidate about the higher prevalence of CD in this population.

TABLE 3. Frequency of consumption of gluten-free foods in the last seven days.

Variables	Total sample, n (%)	Variables	Total sample, n (%)
Raw salad		Soda	
Never	4 (2.8)	Never	74 (52.1)
1-2 x / week	21 (14.9)	1-2 x / week	41 (28.9)
3-4 x / week	23 (16.3)	3-4 x / week	16 (11.3)
5-7 x / week	93 (66.0)	5-7 x / week	11 (7.7)
Cooked vegetables		Gluten-free beer	
Never	19 (13.4)	Never	110 (77.5)
1-2 x / week	25 (17.6)	1-2 x / week	26 (18.3)
3-4 x / week	36 (25.4)	3-4 x / week	6 (4.2)
5-7 x / week	62 (43.8)	5-7 x / week	0 (0)
Fruits		Industrialized cheese bread	
Never	7 (4.9)	Never	97 (68.8)
1-2 x / week	12 (8.4)	1-2 x / week	39 (27.6)
3-4 x / week	21 (14.8)	3-4 x / week	3 (2.1)
5-7 x / week	102 (71.8)	5-7 x / week	2 (1.4)
Beans		Industrialized gluten-free bread	
Never	33 (23.2)	Never	50 (35.2)
1-2 x / week	41 (28.9)	1-2 x / week	29 (20.5)
3-4 x / week	32 (22.5)	3-4 x / week	19 (13.3)
5-7 x / week	36 (25.4)	5-7 x / week	44 (30.9)
Milk or yogurt		Tapioca	
Never	49 (34.8)	Never	69 (48.6)
1-2 x / week	24 (17.0)	1-2 x / week	37 (26.1)
3-4 x / week	14 (9.9)	3-4 x / week	21 (14.8)
5-7 x / week	54 (38.3)	5-7 x / week	15 (10.5)
Gluten-free fried snacks		Pizzas and pasta	
Never	73 (51.4)	Never	43 (30.3)
1-2 x / week	52 (36.7)	1-2 x / week	78 (54.9)
3-4 x / week	17 (11.9)	3-4 x / week	15 (10.6)
5-7 x / week	0 (0)	5-7 x / week	6 (4.2)
Sausages		Meat (beef or pork)	
Never	65 (45.8)	Never	10 (7.0)
1-2 x / week	53 (37.3)	1-2 x / week	25 (17.6)
3-4 x / week	13 (9.1)	3-4 x / week	59 (41.5)
5-7 x / week	11 (7.7)	5-7 x / week	48 (33.8)
Gluten-free savory cookies		Meat (chicken or fish)	
Never	67 (47.5)	Never	7 (4.9)
1-2 x / week	49 (34.8)	1-2 x / week	54 (38.0)
3-4 x / week	18 (12.8)	3-4 x / week	54 (38.0)
5-7 x / week	7 (4.9)	5-7 x / week	27 (19.0)
Gluten-free sweet cookies		Eggs	
Never	51 (35.9)	Never	13 (9.2)
1-2 x / week	56 (39.4)	1-2 x / week	30 (21.1)
3-4 x / week	21 (14.8)	3-4 x / week	41 (28.9)
5-7 x / week	14 (9.8)	5-7 x / week	58 (40.9)

TABLE 4. Nutritional status of celiac individuals.

Variables	Before diagnosis	Now	P value
Weight, kg	62.3±13.8	63.6±11.7	0.147
Body mass index, kg/m ²	23.3±4.7	23.8±3.8	0.114
Nutricional status, n (%)			
Malnourished	14 (11.6)	3 (2.3)	0.016
Normal weight	72 (59.5)	84 (63.6)	
Overweight	25 (20.7)	34 (25.8)	
Obesity	10 (8.3)	11 (8.3)	

Eating habits of CD patients in this study were considered good, but this result may have been influenced by the higher degree of schooling of the population, with better access to information and knowledge related to CD. This can be due to them being part of social media groups related to CD and their access to ACELBRA-RS.

The state of Rio Grande do Sul, where the study was conducted, has presented higher incomes than the national average. Data from 2020 indicate that the per capita monthly family income in Rio Grande do Sul was R\$ 1714.00, while the average in Brazil was R\$ 1349.00. In addition, 12% of Rio Grande do Sul population were considered poor, compared to 24% observed in the country⁽¹⁸⁾. These data agree with the findings of the present study, in which the population had a higher family income.

The dietary pattern of the population in Southern Brazil is also influenced by socioeconomic factors and the food environment. In one study developed a city in Southern Brazil, the lowest socioeconomic position was associated with more economically accessible dietary patterns, such as the traditional dietary pattern (rice, beans, pasta, potatoes and red meat), and a risk pattern, characterized by the consumption of ultra-processed foods. On the other hand, a better socioeconomic position was associated with a higher consumption of healthy eating patterns (rich in fruits, vegetables and whole grains), but also a fast food pattern (rich in fatty snacks), which are more expensive foods⁽¹⁹⁾. Thus, it is observed that individuals occupying better socioeconomic positions can choose between healthy and unhealthy eating patterns. Individuals of lower socioeconomic status are restricted to cheaper, monotonous, and possibly low-quality food patterns^(19,20). Food consumption data for the

population of Rio Grande do Sul vary according to age and education^(19,20). Regarding the population of celiacs in the state, the literature lacks information.

In this sample the consumption of salads and fruits is frequent, with more than half of participants reporting a frequency between 5 and 7 times a week. The consumption of legumes and cooked vegetables reached 43.8% of the sample, with a frequency of consumption between 5 and 7 times a week. These findings were also observed in a previous study performed in Brazil, in which fruits and vegetables were consumed with adequate frequency⁽²¹⁾. However, a study performed in Madrid (Spain) found different results: the daily consumption of vegetables and fruits are low just after CD diagnosis⁽²²⁾.

Beef and pork consumption among individuals in this study is considered moderate, since 41.5% of the participants reported a consumption frequency of 3 to 4 times a week. As to white meats (chicken and fish), consumption was considered low, with 38% of individuals showing the same frequency as beef and pork. The consumption of eggs was considered moderate, even if those are a great source of protein, with only 40.9% of participants ingesting them with a frequency between 5 and 7 times a week. In the Spanish population, there is evidence that after a year of gluten-free diet the frequency of meat consumption by adults was reduced⁽²²⁾. In a previous study, the feeding habits of CD patients of Brasilia, through ACELBRA-DF (Federal District) were evaluated, and most participants were found to ingest egg and meats in adequate frequencies⁽²¹⁾. However, there is also evidence of excessive consumption of meat and its products by patients with CD^(5,6). Foods like fruits, vegetables, meats and eggs lack gluten, and thus are more frequently present in the meals of peoples with CD. The consumption of these foods by CD patients provides a more balanced diet by replacing industrialized foods and preventing their consumption.

The ingestion of gluten-free industrialized foods can be an alternative in the eating habits of patients with CD, according to a previous study that detected high gluten-free bread, doughs and cookies consumption⁽²¹⁾. In our study, the consumption of these kinds of foods was less frequent, with most participants eating these only once or twice a week. In

the same manner, a low tapioca flour (starch) consumption was detected, with most individuals consuming none of it in a week period. Another study shows that tapioca flour was more frequent in the diet of patients with CD, reaching 61.61% of the individuals⁽²¹⁾. These industrialized, gluten-free foods are an option for CD patients, and there are healthy choices among the available products. In this study, most people with CD opted for the consumption of non-processed products, such as fruits, vegetables, legumes, meat and eggs.

It was thus observed that CD patients in Rio Grande do Sul show a good adherence to a gluten-free diet, with 77.1% of the individuals never ingesting gluten. In a previous study, an even higher adhesion rate was found, with 96% of the participants not consuming gluten at all, even if there were reports of intentional gluten ingestion during social events and travels⁽²³⁾. Our study showed that 16.9% of the participants sometimes ingested gluten, with a frequency between once a month or even free consumption. Despite that, a study showed that 4% of individuals relax their diet sometimes when having dinner in restaurants or consuming multicultural foods during trips or for convenience⁽²³⁾. Many factors are associated with a lower adhesion to strict diets or to the occasional consumption of gluten, such as: young age at diagnosis, adolescence, local eating culture, lower socioeconomic level, traveling and eating in restaurants, lacking of symptoms at the moment (asymptomatic patients can have a higher occasional gluten consumption frequency)^(16,24) and lower degree of knowledge and low motivation of the patient⁽²⁴⁾.

In this study, most patients reported caring for their gluten ingestion, even taking precautions against cross contamination, with 85.9% of the participants taking these precautions at home and 62.4% at restaurants. In a recent study, it was observed that in a period of 10 days, 67% of the participants with CD were exposed to gluten⁽²⁵⁾. However, the risk of cross contamination increases when foods are kept in open containers and sold in bulk, on buffets, salads or in any place where a variety of foods share the same space as foods that contain gluten⁽²⁶⁾. Thus, patients with CD can have some degree of difficulty following a gluten-free diet strictly and prevent cross

contamination. The results show that most patients with CD can only attain a gluten-reduced diet, since exposition to gluten is so common, intermittent and, in general, silent⁽²⁷⁾.

In addition to celiacs, other individuals adhere to a gluten-free diet, mainly patients with non-celiac gluten sensitivity. This sensitivity can be defined through individuals with complaints of intestinal and extraintestinal symptoms related to gluten ingestion, with rapid improvement after removing these foods from the diet⁽²⁸⁾. In that case, the gluten-free diet can bring benefits. However, another study points out that individuals who do not have any gluten-related disorders believe that a gluten-free diet brings health benefits, such as weight loss⁽²⁹⁾. There is still a need for further studies that assess eating habits in individuals who exclude gluten from their diet, for reasons other than celiac disease^(28,29).

The impact on eating and eating habits will also affect health and the nutritional status of CD patients. In our study, there was no difference on weight values observed before and after CD diagnosis. Another study evaluated the parameters of nutritional status after 1 year of gluten-free diet, and also did not observe any significant weight alteration⁽²²⁾. However, in our population, there was an improvement in the categories of nutritional status, with a reduction in the prevalence of malnourished patients. After adopting a gluten-free diet, it is expected that the nutritional status of an individual is recovered, since possible symptoms such as bad nutrient absorption are corrected⁽³⁰⁾.

Most CD patients of our study are currently classified as normal weight. However, the amount of individuals classified as overweight by their BMI increased from 20.7% to 25.8% after CD diagnosis. In relation to obesity, there was no significant difference. Other authors also report a risk of overweight or obesity in patients with CD, with women of this group showing a higher occurrence of both conditions when compared to women without CD⁽⁹⁾. Another study evaluated the BMI of 679 patients with CD and reported that, at diagnosis, the BMI of most patients was lower than that of the general population, but after 39.5 months, 20.5% and 11.5% of the patients exhibited overweight and obesity, respectively⁽⁸⁾. Thus, literature shows that almost half of adult

patients with CD have a BMI higher than 25 kg/m² at diagnosis, indicating overweight or obesity, contrasting with the classic CD patient image of a thin and malnourished patient^(10,11).

The nutritional status of individuals is related to eating habits, to difficulties to not use gluten in the production of processed foods, and the fact that gluten-free foods in general have more carbohydrates and lipids than their gluten containing ones. It is considered relevant that obesity is increasing among CD patients, even in their initial presentation⁽³¹⁾. The risk of overweight and obesity, especially in the first year after the adoption of a gluten-free diet, may be influenced by the fact that CD patients can eat without suffering any symptoms anymore, and since don't feel uncomfortable or sick because their absorption capacity is improved. If this is combined with a higher consumption of gluten-free foods of high caloric content, the patient will gain weight⁽³⁰⁾. In our study there are reports of good eating habits in the population, and thus individuals did not show an increase in weight nor an overweight or obesity risk.

Consultations and follow-ups with a health professional are essential for the treatment of CD. This study showed that, of the 142 participants, 88.7% go through these kinds of procedures with health professionals. A comparative study revealed a lower incidence of health professional care of CD, with only 69% of the patients doing so⁽¹⁶⁾. Accompaniment with a nutritionist was performed by only 35.2% of the population of this study, but 80.3% visited a gastroenterologist regularly, which is the specialist for the treatment of CD. Despite that, a study showed that 90.38% of patients with CD believe that nutritional therapy is the only possibility of controlling the condition⁽²¹⁾. The nutritionist is the ideal professional for such a treatment, since he/she knows gluten-free diets, specially for the first year of diagnosis follow-up⁽⁴⁾. The nutritionist stimulates the adherence to the treatment, preventing eating monotony and following eating habits⁽²¹⁾.

This research is a transversal study performed with patients with CD in the state of Rio Grande do

Sul, Brazil. Data collection was carried out completely online, through a Google Forms questionnaire, and the focus was to achieve a good reach through all the state, with a good number of participants with CD. Some limitations of this study are the limited FFQ, not completely adequate for this public, and only people with internet access and social media participating in the study. This can bring about a selection bias in the results and limit the population of accessible patients. The FFQ was adapted to CD individuals by adding gluten-free foods to it, and obtaining better results about the eating habits of these patients. Anthropometric data reported by participants can show a result bias, but it is important to note that, due to the research happening completely online, it had the best potential to reach the whole state in order to evaluate the nutritional status of patients with CD living in Rio Grande do Sul.

CONCLUSION

This study exhibited a higher prevalence of women with CD, and also Caucasians and of higher schooling and income, which influenced the results. Eating habits of these patients are, in general, considered healthy. This is due to a balanced gluten-free diet, containing a balance of healthy foods, such as fruits, vegetables, legumes, meats and eggs, and to a lower frequency of consumption of industrialized or high fat content foods. The nutritional status also remained equal before and after CD diagnosis, with no significant changes. Adequate nutritional education for these patients is the key to a balanced diet in the long run.

Authors' contribution

Sganzerla A participated in the study design, data collection, writing. Nicoletto BB participated in the study design, statistical analyses and reviewing.

Orcid

Alice Sganzerla: 0000-0002-4455-676X.

Bruna B Nicoletto: 0000-0001-9378-1130.

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RESUMO – Contexto – A doença celíaca é definida como uma doença crônica autoimune que afeta o intestino delgado em pessoas geneticamente predispostas, desencadeada pela exposição ao glúten. O único tratamento para doença celíaca até o momento é uma dieta isenta de glúten por toda a vida, levando em consideração que os hábitos alimentares de celíacos desempenham um papel importante em seu estado nutricional. **Objetivo** – Avaliar os hábitos alimentares e o estado nutricional de pacientes com doença celíaca do Rio Grande do Sul. **Métodos** – Trata-se de um estudo transversal com 142 pacientes com diagnóstico de doença celíaca residentes no Rio Grande do Sul (Brasil) e maiores de 18 anos. Para realização deste estudo, foi aplicado um questionário on-line com divulgação através de redes sociais e também pela Associação dos Celíacos do Brasil – Seção Rio Grande do Sul. Foram coletados dados sociodemográficos, histórico da doença celíaca, história clínica geral, peso e altura referidos e dados de consumo alimentar através de questionário de frequência alimentar do SISVAN e questões gerais. **Resultados** – A amostra foi constituída por 142 indivíduos com idade média de 39,75±11,5 anos, sendo 94,4% mulheres e 93% de etnia branca. Os participantes apresentaram cuidados em relação a dieta isenta de glúten, sendo que a maioria não ingere glúten (82,2%) e possuem cuidados em relação a contaminação cruzada por glúten em suas casas (85,9%) e em restaurantes (62,4%). A maioria da amostra também apresentou bons hábitos alimentares, com o consumo frequente de frutas, legumes, verduras, carnes, ovos e pouco frequente de industrializados e gorduras. O peso corporal antes e após o diagnóstico de doença celíaca não apresentou mudanças significativas (62,3±13,8 versus 63,6±11,7 kg; $P=0,147$); entretanto, houve melhora na classificação do estado nutricional pelo índice de massa corporal (11,6% versus 2,3% de desnutridos; $P=0,016$). **Conclusão** – A maioria dos pacientes com doença celíaca deste estudo apresentam bons hábitos alimentares com uma dieta isenta de glúten balanceada e com melhora do estado nutricional após o diagnóstico de acordo com a classificação do índice de massa corporal.

Palavras-chave – Hábitos alimentares; doença celíaca; dieta isenta de glúten; estado nutricional.

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