

## **Gluten-free dietary compliance in Brazilian celiac patients: questionnaire versus serological test**

### **Adesão à dieta isenta de glúten: questionário versus testes sorológicos**

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#### **ABSTRACT**

This study assessed the adherence to treatment of celiac disease (CD) patients being followed at Brasilia's University Hospital. Forty-six CD patients underwent structural interviews. Their answers were compared with their IgA-tTG test results to determine their level of compliance with a gluten-free diet (GDF). The serological test results showed that 56.5% of the patients did not follow a GFD. Consumption of processed gluten-free foods (GFF) was significantly associated with IgA-tTG test result. Eighteen patients had other diseases in addition to CD and 77.8% of these had positive IgA-tTG results. 90.0% of the patients who presented negative serological test results attended the follow-up visits regularly. Adherence to treatment by this group of CD patients is low although most of them report complying with the diet. Compliance is affected by consumption of GFF, follow-up attendance and presence of other diseases. Awareness of these factors allows the establishment of actions that are beneficial to the celiac's treatment.

#### **KEYWORDS**

Celiac disease; gluten-free diet; IgA-tTG.

#### **RESUMO**

O presente estudo avaliou a adesão ao tratamento da doença celíaca (DC) por pacientes em acompanhamento no Hospital Universitário de Brasília. 46 pacientes foram submetidos a entrevistas com questionário estruturado e suas respostas foram comparadas aos resultados do teste IgA-tTG para determinar seu nível de cumprimento de uma dieta livre de glúten (DLG). Os resultados dos testes sorológicos mostraram que 56,5% dos pacientes não seguem um DLG. O consumo de alimentos industrializados sem glúten (AISG) foi significativamente associada com o resultado do teste IgA-tTG. 18 pacientes tinham outras doenças, além da DC e 77,8% deles tiveram resultados IgA-tTG positivos. 90,0% dos pacientes que apresentaram os resultados dos testes sorológicos negativos participaram das visitas de acompanhamento regularmente. A adesão ao tratamento por este grupo de pacientes com DC é baixa, embora a maioria deles relatam cumprimento da dieta. A adesão ao tratamento é afetada pelo consumo de AISG, pela frequência de acompanhamento e pela presença de outras doenças. A consciência destes fatores permite o estabelecimento de ações que são benéficas para o tratamento do paciente.

#### **PALAVRAS-CHAVE**

Doença celíaca, dieta sem glúten; IgA-tTG.

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## INTRODUCTION

Celiac disease (CD) is considered a global public health problem, with an estimated prevalence is 1:100 individuals and the only treatment for this is lifelong adherence to a gluten-free diet (GFD) (1,2).

Strict GFD compliance is not an easy task, mainly due to a generally difficult adaptation to gluten-free foods (GFF), social embarrassment, and cost and difficulty of purchasing GFF (1,2,3,4).

The aim of this study was to assess GFD compliance and identify compliance-promoting factors in celiac patients diagnosed at the CD Research Center of the Brasilia University.

## PATIENTS AND METHODS

The present cross-sectional study used quantitative methods. Structured interviews were conducted with the administration of a questionnaire with closed questions about specific questions regarding the patient's GFD compliance and compliance GDF promoting factors such as: attend the annual follow-up appointments, clinical manifestations, the consumption of processed GFF, age at the diagnosis.

The study included a convenience sample of 46 CD patients (32 females and 14 males, aged 3 to 49 years, mean age of 17 years). All patients had been on a GFD for at least one year. The study was approved by the Research Ethics Committee of the Brasilia University (protocol # 053/2004).

The questionnaire was filled out, blood samples were taken from all patients, centrifuged, and the resulting sera were tested for the presence of IgA anti-tissue transglutaminase antibodies (IgA-tTG) by ELISA (IN-OVA Diagnostic Inc, USA) to determine GFD compliance.

The data were analyzed by descriptive statistics and Pearson distribution of Fisher's exact test using the software SPSS version 11.5 and Microsoft Excel XP ®. A 95% confidence interval was calculated and  $p \leq 0.05$  was considered significant.

## RESULTS AND DISCUSSION

The IgA-tTG test was positive in 26 (56.5%) of the 46 patients. The majority of the positive tests was from adolescents and, in contrast, the majority of the negative tests was from schoolchildren, although no statisti-

cally significant correlation was found between age group and serological test result ( $p=0.47$ ) (Table 1).

Most of the patients (69.3%) with a positive serological test result were diagnosed after their seventh birthday, and most of those with negative IgA-tTG (55.0%) were diagnosed between their second and sixth birthday. Although this association was not significant ( $p=0.31$ ). Most patients with positive (73.1%) and negative (65.0%) serological test results had been diagnosed 4 to 6 years before the study ( $p=0.64$ ). Hence, there was no correlation between time since diagnosis and adherence to treatment.

Most of the patients (61.1%) reported that GFD compliance has the greatest impact on their quality of life; however, 43.5% admitted to noncompliance. All individuals who admitted to noncompliance ( $n=20$ ) presented positive IgA-tTG, confirming their deliberate GFD non-compliance.

60.9% of the study patients reported full GFD compliance, but only 43.5% presented negative serological test results and 35.7% of those who reported strict compliance presented positive IgA-tTG. These facts are strong indicators that involuntary GFD noncompliance is likely. One possible explanation is accidental ingestion of gluten. This happens frequently when the labels on processed foods are inadequate or when gluten is present in meals prepared away from home (5).

A significant relationship was found between consumption of processed GFF and GDF compliance ( $p=0.02$ ). Most of the individuals (61.5%) with positive serological test results never buy these products (Table 1). Half (50%) of those with negative serological test results buys. Thus, consumption of processed GFF is an important factor for compliance.

The variable "homemade GFF" shows that more than half the patients (52.2%) always prepare these foods at home and that 19.6% rarely or never do this. As the frequency of preparing GFF at home decreases, the percentage of patients with positive IgA-tTG results increases (Figure 1).

Most patients (67.4%) attend the annual follow-up appointments, indicating their interest in the treatment. Half (50%) of the patients with positive IgA-tTG results and 90% of those with negative IgA-tTG results attend these annual appointments. This statistical association ( $p=0.004$ ) indicates that follow-up influences compliance (Table 1).

**Table 1.** Correlation between serological test results and questionnaire responses.

	IgA tTG	
	% Positive (n=26)	% Negative (n=20)
<b>Age at study entry*</b>		
Preschool child	60.0	40.0
Schoolchild	37.5	62.5
Adolescent	68.4	31.6
Adult	50.0	50.0
<b>Age at diagnosis*</b>		
Infant (0 to 1 year)	3.7	0.0
Preschool child	26.9	55.0
Schoolchild	19.2	10.0
Adolescent	23.1	10.0
Adult	27.0	25.0
<b>Time since diagnosis</b>		
1 to 3 years	19.2	25.0
4 to 6 years	73.1	65.0
7 to 9 years	7.7	5.0
More than 9 years	0.0	5.0
<b>Consumes processed GFF</b>		
Always	11.5	10.0
Sometimes	3.9	40.0
Rarely	23.1	20.0
Never	61.5	30.0
<b>Attends annual follow-up</b>		
No	50.0	10.0
Yes	50.0	90.0
<b>Seeks information on treatment</b>		
Always	35.7	64.3
Sometimes	80.0	20.0
Rarely	100.0	0.0
Never	100.0	0.0
<b>Clinical Manifestations</b>		
Irritability	87.5	12.5
Diarrhea	60.0	40.0
Constipation	60.0	40.0
Flatulence	70.0	30.0
Bloating	85.7	14.3
Fatigue	64.3	35.7
Joint pain	76.9	23.1
Recurring mouth ulcers	57.1	42.9
Recurring mouth ulcers	57.1	42.9

\* Infant (0 – 1 year); Preschool child (2 – 6 years); Schoolchild (7 – 9 years); Adolescent (10 to 18 years); Adult ( $\geq$  19 years).

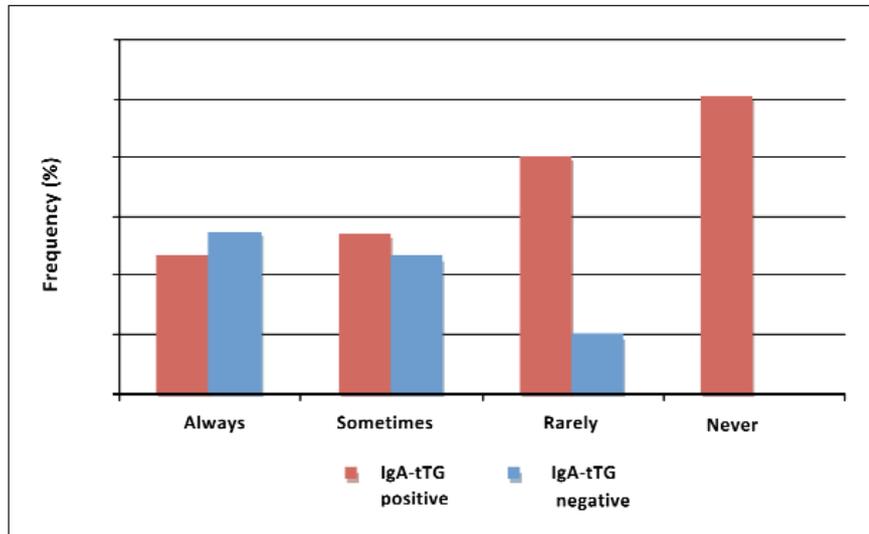
**Figure 1.** Association between frequency of preparing GFF at home and IgA-tTG test.

Table 1 shows that most participants who always seek information on CD present negative IgA-tTG and that all patients who do not seek such information present positive IgA-tTG results. Therefore, a direct correlation was found between compliance and awareness GDF.

Regarding the correlation between clinical manifestations of CD and serological test results, most people who reported experiencing CD symptoms presented positive IgA-tTG results (Table 1). The main symptoms reported by the participants were irritability, bloating, joint pain and impaired growth. The present study found a positive correlation between symptom remission and GDF compliance.

39.1% participants reported having other diseases. The diseases cited most often were bronchitis (16.7%), diabetes (16.7%), sinusitis, gastritis and lactose intolerance (11.1%). Most patients with other diseases presented positive IgA-tTG results while most without other diseases presented negative IgA-tTG results. This

association was statistically significant ( $p=0.02$ ). Individuals who presented other diseases ( $n=18$ ) were asked which item had a greater impact on their quality of life: GFD compliance or the other disease. Most (61.1%) reported that GFD compliance was more impacting.

## CONCLUSION

The present study show that most participants are GFD noncompliant, despite stating otherwise. Factors that impact GFD compliance are consumption of processed, follow-up visit attendance and the presence of other diseases. Knowing what affects GFD

compliance allows for the establishment of actions that benefit the treatment of CD patients.

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