Research Article

Prevalence of Anemia in a Population with Celiac Disease in Tébessa (Algeria)

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Abstract

Celiac disease causes and/or aggravates nutritional deficits. The purpose of this work was to determine the prevalence of anemia in people with celiac disease. This was a cross-sectional descriptive study in subjects with celiac disease followed in two health services in the city of Tebessa (Algeria) and who had a blood count (NFS) during their hospitalization.

The results show that strict compliance with the gluten-free diet was reported for only 19% of cases. The prevalence of anemia was 60%. Female celiac patients are more affected by anemia. In 46.87% of anemic celiac patients, hemoglobin was between 9 and 12 g/dl. In 39.06% of cases, hemoglobin was between 7 and 9 g/dl and less than 7 g/dl in 14.06% of cases.

The statistical tests show the existence of a significant link ($p < 0.05$) between anemia and the economic level and the level of education of the households of the celiac patients and between the anemia and the compliance with the gluten-free diet.

Keywords: Anemia; Prevalence; Celiac disease; Gluten-free diet; Algeria

Introduction

Celiac Disease is considered a neglected public health problem. Its distribution around the world seems to have followed the evolution of the eating habits of the populations [1].

The treatment of celiac disease, so based on dietetics, has until now, consisted in the total eviction of gluten contained in some cereals, mainly wheat, rye, barley and oats, diet food [2]. This diet reduced the incidence of malignant and malignant complications (digestive lymphoma) [3,4]. However, cereals, especially wheat, occupy a very important place in the diet of the Algerian population. This makes adherence to the gluten-free diet, although feasible, difficult in the diet of celiac patients. This difficulty is due to the use of expensive gluten-free products that are not widely available and which are not very diversified with regard to the traditional dietary pattern [5].

The purpose of this study was to determine the prevalence of anemia in people with celiac disease in Tebessa (Algeria).

Methodology

This is a cross-sectional study of 100 symptomatic celiac patients attending two health services (adult and pediatric) in the city of Tebessa and who had a blood count (NFS) during their hospitalization. Patients who met these criteria but whose NFS was preceded by a blood transfusion within 120 days were excluded. Age, sex, and NFS results were recorded for each patient.

The NFS were performed at the laboratory of the health facility on a hematology automaton. The definition of anemia and its severity by age was based on the WHO hemoglobin limit values [6].

The socio-economic status of the families of celiac patients was determined using various indicators, including the level of education

of patients and parents, the professional level of patients and parents, and the availability of material resources of the family. . The average salary estimate by type of occupation refers to the salary grid of the Algerian Chamber of Labor (Ministry of Labor and Employment).

Compliance (adherence to the gluten-free diet) was assessed according to two criteria: self-reporting of patients based on the frequency of consumption of products with gluten and the presence of symptoms.

Thus the observance of the gluten-free diet is classified into three groups:

- Good compliance: when the patient reported eating gluten-free products, with no or a significant decrease in the frequency or intensity of symptoms (absence of abdominal pain, bloating, diarrhea, constipation, and/or anemia).

- Poor compliance: when the patient has declared eating gluten-containing products occasionally. The frequency can be once a month or at least 5 times a year.

- Poor compliance (non-compliance): when the patient has declared eating foods that contain wheat and its by-products. The frequency is every day or every week. The patient is aware of having interrupted the diet, with an increase in the frequency or intensity of symptoms.

For analysis of the collected data, Minitab 16 computer software was used for statistical analysis. The Chi-square Independence Test is used to test if the variables are independent. If the conditions of application of the chi2 test are not fulfilled according to which all the theoretical numbers must be greater than 5, the exact Fisher test is carried out with the software R, because it is not available on Excel stat and Statistica for tables of more than 2 rows or 2 columns. The

Table 1: Patient Distribution (n = 100) by Sex and Age Group.

Group	Age range	Male	Female	Total
Children	[0- 2] years	1%	1%	2%
	[2 -5] years	2%	5%	7%
	] 5 -12] years	12%	17%	29%
Teenager	[12 -18] years	21%	14%	35%
Adult	[18-58] years	8%	19%	27%
Total	[0-58] years	44%	56%	100%

Table 2: Distribution of celiacs by anemia.

	Male	Female	Total
Anemic	27	37	64
Not anemic	17	19	36
Total	44	56	100

Table 3: Distribution of celiacs by anemia and age groups.

	anemic	Not anemic	Total
≤ 2 years	0	2	2
[2 -5] years	4	3	7
[5 - 12] years	19	10	29
[12 - 18] years	22	13	35
[18 -58] years	19	8	27
Total	64	36	100

threshold of significance is set at 0.05.

Results

Presentation of the studied population

The study involved 100 patients, 44 male and 56 female. A clear female predominance is observed in our patients with a sex-F/H ratio of 1.27.

The average age of celiac patients is 16.12 ± 11.86 years spread over a range from 1 to 58 years. Table 1 gives the frequency relative to the age groups studied.

The majority of coeliacs surveyed (73%) belong to the age group <18 years (35% teenager and 38% children), while adults seem to be fewer with 27% (8% male and 19% female).

With regard to the level of family education, we note that for 29% of the population studied, their households have a high level of education (at least one person having a university education), for half (50%), the level of education is average (at least one member with a secondary or basic level of education), for 21%, the level of education is low (the highest level of education in the family does not exceed the primary level).

Regarding the socioprofessional level of patient households, about 54% of patients belong to average socio-economic households, 30% to low level, and 16% to high.

Observance to the gluten-free diet

Adherence to a gluten-free diet is estimated based on patient reporting, frequency of consumption of products with gluten, and improvement of symptoms. One-third of survey respondents (33%) acknowledged poor adherence to a gluten-free diet (consumption of gluten-containing products, presence of symptoms, strict adherence to a gluten-free diet was associated with a favorable clinical response for 19% of significant decrease in the frequency and intensity of clinical symptoms, however, 48% of respondents reported that they did not experience clinical improvement despite having a strict gluten-free diet.

Anemia

Among the 100 celiac patients who were tested for hemoglobin before and after the gluten-free diet (56 female patients, 44 male patients), 86% had anemia at diagnosis. After at least 6 months of gluten-free diet and at the time of the consultation, anemia persists in more than half of celiac patients (64%: 37 female and 27 male).

In 30 anemic patients, ie 46.87%, the hemoglobin was between 9 and 12 g/dl. In 25 cases, 39.06%, the hemoglobin was between 7 and 9 g/dl. In 9 cases, 14.06%, the hemoglobin was less than 7 g/dl.

Distribution of anemic celiac patients by sex and age

The distribution of anemic celiac patients by sex is shown in Table 2.

Although not significant (chi2 = 0.24, dl = 1, p = 0.62), celiac patients are more affected by anemia.

The exact Fisher test shows that anemia is independent of age groups (p = 0.43). The distribution of anemic celiac patients by age group shows that anemia is completely absent in patients under two years of age. Anemia is more common in patients aged 5 years and older (Table 3).

Anemia and the socio-professional level of households

The exact Fisher test carried out shows the existence of a significant link (p <0.05) between anemia and the economic level of households of celiac patients (Table 4). Thus anemia increases with the decrease in the economic level of households. Celiac patients from low-income households are all anemic.

Anemia and the level of education of households

A significant link is also found between anemia and the educational level of celiac patients' households (Fisher exact test, p <0.05) (Table 5). Households with a high level of education have fewer anemic celiacs, while those with low educational attainment are all anemic.

Anemia and compliance with gluten-free diet

Anemia is significantly dependent on RSG compliance (Fisher exact, p <0.05) (Table 6). Celiacs with good compliance are less anemic.

Discussion

The prevalence of anemia in our study was 64%. This value is well above the 40% threshold defined by WHO for severe endemic anemia in a population [7].

Anemia is a sign of malabsorption secondary to poorly managed celiac disease [8,9]. It represents the most common extra intestinal manifestation of celiac disease, and often its initial manifestation [10].

The proximal small intestine is the predominant site of inflammation, and also the site of iron absorption, the association

Table 4: Distribution of celiacs by anemia and socio-professional level.

	High socio-professional level	Average socio-professional level	Low socioprofessional level	Total
Anemic	6	28	30	64
Not anemic	10	26	0	36
Total	16	54	30	100

Table 5: Distribution of celiacs by anemia and level of education.

	High level of education	Average level of education	Low level of education	Total
Anemic	15	28	21	64
Not anemic	14	22	0	36
Total	29	50	21	100

Table 6: Distribution of celiacs by anemia and the gluten-free diet compliance.

	Good compliance	Poor compliance	Bad compliance	Total
Anemic	2	32	30	64
Not anemic	17	16	3	36
Total	19	48	33	100

celiac disease-anemia is a well-established fact. The frequency of anemia in celiac disease ranges from 12 to 69% [11]. It is particularly higher in patients with a long neglected disease [12]. However, studies have shown that 78% of adults have been cured of anemia with the only well-followed gluten-free diet [13]. In patients with villous atrophy, the gluten-free diet usually allows the remission of symptoms related to gluten intolerance, particularly anemia [14].

The persistence of anemia may be explained by errors in gluten-free diet, but there appears to be a subgroup of patients who, despite strict gluten-free diet, do not have villous regrowth and more frequently have iron deficiency anemia. These patients could benefit from parenteral iron therapy. The long-term outcome and surveillance of these asymptomatic patients, but without villous regrowth, remains to be assessed, particularly with regard to the risk of lymphomatous complications [15].

Strict adherence to the gluten-free diet improves clinical symptoms and prevents nutritional deficiencies and complications related to celiac disease [3,4].

Adherence to the gluten-free diet is a major constraint, and two types of nutritional complications can be expected (apart from refractory forms in which nutritional status will continue to deteriorate): the consequences of gluten-free diet poorly monitored, with persistence of minor histological lesions and nutritional deficiencies, and the consequences of a well monitored gluten-free diet but accompanied by numerous exclusions, also causing deficiencies.

According to patient reports, compliance in this study was considered good in only 19% of cases. gluten-free diet appears to be difficult for most patients for a variety of reasons. Strict monitoring of gluten-free diet is not a problem in young children, at this age, in fact, food grains can be easily replaced by rice or corn flour and by any form of pure starch without difficulty. acceptance. The difficulties of applying the gluten-free diet are thus encountered especially in the older child, adolescents and adults.

The non-respect of the diet is often justified by the quality of social life, it is interesting to look for methods to reduce the feeling of isolation and to reinforce the sense of belonging, acceptance and normality in relation to dietary restrictions because the consequences of non-compliance are serious for people with celiac disease. The risk of infertility, peripheral neuropathies, osteoporosis, lymphomas and cancers in the small intestine and esophagus is higher [16].

Educational attainment and socioeconomic level are major elements for the success of dietary management of celiac disease, both in the strict adherence to and application of the gluten-free diet and, in addition, on the other hand, in the replacement of cereal products with gluten by others with the same nutritional and energy value without gluten. In Algeria, the price of gluten-free foods is very high, as well as that of replacement products.

The socio-professional level is of course also related to the level of education, and knowledge of substitute products requires a certain level of understanding.

The presence of gluten is difficult to avoid, as contamination can also occur unintentionally [17]. The celiac patient must learn about foods and food preparations that are banned and allowed under the gluten-free diet, the hidden ingredients and additives in these products, and read the labeling of food.

Patients are advised to benefit from consultation and follow-up with a dietitian or a doctor in order to facilitate the observance of the diet because to this day, the fact of being regularly followed up with specialists remains the most effective measure to improve the observance of the diet.

In addition to food-related problems, the celiac patient must also be informed that medications may contain gluten from their excipients (wheat starch). He must report his celiac disease at any medical consultation leading to a medication prescription.

Conclusion

Celiac disease is now more rarely associated with a caricatural picture of malnutrition, but its nutritional consequences remain significant, especially anemia. gluten-free diet remains the cornerstone of management, but screening for persistent deficiencies and complications is important, as is screening for poor adherence. The place of supplementation in certain nutrients deserves to be evaluated.

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