Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v6i4.2304
*Biol. Clin. Sci. Res. J., Volume 6(4), **2025**: 2304*
Original Research Article

Frequency of Celiac Disease in Patients with Iron Deficiency Anemia

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(Received, 05th January 2025, Accepted 15th March 2025, Published 30th April 2025)

Abstract: *Coeliac disease is an immune-mediated enteropathy triggered by gluten ingestion in genetically susceptible individuals. Iron deficiency anemia (IDA) is one of the most common extraintestinal manifestations of coeliac disease and may be the sole presenting feature in some patients. Early identification of coeliac disease among patients with IDA is essential to prevent long-term complications and improve clinical outcomes.* ***Objective:*** *To determine the frequency of coeliac disease among patients presenting with iron deficiency anemia.* ***Methods:*** *This cross-sectional study was conducted in the Department of Medicine at Lady Reading Hospital from 18-May-2024 to 18-November-2024. A total of 218 patients aged 20–60 years of either gender with iron deficiency anemia, defined as a serum ferritin level below 50 ng/mL, were enrolled. Patients with malignancy, chronic kidney disease, cardiac disease, or liver disease were excluded. All participants underwent clinical evaluation and serological testing for coeliac disease, including total IgA, IgA anti-tissue transglutaminase (IgA-tTG), and IgA anti-endomysial antibodies (IgA-EMA). Positive cases were confirmed by duodenal biopsy. Data were analyzed using SPSS version 20. Descriptive statistics were calculated, and associations between coeliac disease and demographic variables were assessed using appropriate statistical tests, with a p-value <0.05 considered statistically significant.* ***Results:*** *The mean age of the participants was 39.76 ± 11.92 years. There were 119 (54.6%) males and 99 (45.4%) females. Coeliac disease was diagnosed in 23 patients, yielding a frequency of 10.6%. Among patients diagnosed with coeliac disease, abdominal pain was reported by 9 (39.1%) patients, while headache was reported by 4 (17.4%). No statistically significant associations were observed between coeliac disease and age group, gender, or place of residence (all p > 0.05).* ***Conclusion:*** *Coeliac disease was identified in 10.6% of patients presenting with iron deficiency anemia. Given this notable frequency, screening for coeliac disease should be considered in patients with unexplained iron deficiency anemia to facilitate early diagnosis and appropriate management.*

Keywords: Breastfeeding Practices, Exclusive Breastfeeding, Predominant Breastfeeding, Partial Breastfeeding, Maternal Employment

[***How to Cite:*** Ullah S, Zeb S, Malik A. Frequency of celiac disease in patients with iron deficiency anemia. *Biol. Clin. Sci. Res. J.*, **2025;** 6(4): 291-293. doi: https://doi.org/10.54112/bcsrj.v6i4.2304]

Introduction

Celiac disease (CD) is an enteropathy of the small intestine. It is initiated by contact to gluten in the diet of vulnerable individuals. Inherent predisposition has a role in the vulnerability. Unfortunately, there is presently no cure for this lifelong illness besides avoiding gluten at all costs (1). Some patients with CD may have no symptoms while others may present with symptoms like diarrhea and failure to thrive. Damage to enterocytes in the intestine is the root cause of the clinical signs of celiac disease (2). Chronic inflammation and villi atrophy are hallmarks of the full-blown clinical picture, particularly in the small intestine (3).
Tissue transglutaminase antibody plays a key role in this condition as a result of an immune system reaction to gluten. Yet, other hypothesized routes have been proposed to have a role in the development of the disease. Gluten's glycoprotein gliadin directly poisons enterocytes by stimulating the cells to make more of the inflammatory cytokine IL-15 (4). Intestinal infections in young children have been linked to an increased risk of developing celiac disease, according to some research. This is predictable given the site of damage, but it may also be directly related to the immunological dysfunction that underlies celiac disease (4). Iron deficiency anaemia (IDA) has many extra intestinal signs in adults, including weariness, headaches, and psychological issues. In addition to these, alopecia, infertility, peripheral neuropathy, and osteoporosis have been observed only in adults (5). The most prevalent form of microcytic anaemia is IDA, which affects. Around half of the cases are attributed to a lack of iron. Three of the most prevalent reasons for iron deficiency anaemia include hyper menorrhea, occult intestinal hemorrhage, and poor iron absorption (5). Anaemia is a common extra intestinal symptom of CD and sometimes the primary clinical characteristic. Up to 46% of cases of non-classic CD have been linked to IDA; this is a condition that is more common in adults than in youngsters (6). There is a broad range in the increasing incidence of CD among patients with IDA. The agreement that testing should be conducted in all IDA patients is supported by a large meta-analysis that included data from multiple countries showing that biopsy confirmed CD in 1 of every 31 patients with IDA, on average (7, 8). A study showed the rate of CD **(**5.4%) among patients with IDA (9). Evidence linking iron deficiency anaemia and celiac disease has been examined extensively. In spite of the importance of this connection, the people of Pakistan have generally ignored it until recently due to a lack of adequate health care facilities. The purpose of this research is to determine how common celiac disease in patients with iron deficiency anemic population.

Methodology

A cross-sectional study was carried out from 18-May-2024 to 18-November-2024 in the department of Medicine, Lady Ready Hospital, Peshawar, after obtaining ethical clearance from the hospital **.** The study enrolled 218 participants. The sample size calculation was performed using WHO sample size calculator, using the proportion of celiac disease taken from a previous study 5.4%, (9) margin of error 3% and confidence interval 95%. Patients were selected in the study using non-probability consecutive sampling method.
Patients aged 20 to 60 years, of either gender presenting with iron deficiency anemia were included. Iron deficiency anemia was defined as ferritin level < 50 ng/mL (112.35 pmol/L). Patients with history of malignancy, chronic kidney disease, cardiac and liver disease were excluded.

All participants were given detailed information about the study's goals, likely benefits, and any risks. All patients were asked to sign an informed written consent form. Patients' demographics data (such as gender, age, and residence) was acquired, and a comprehensive health details and physical exam was undertaken. Patients of iron deficiency anemia were subjected for the confirmation for celiac disease following inflammatory markers and duodenal biopsy were used such as Positive IgA, IgA-tTG, and IgA-EMA examination and duodenal biopsy showing intraepithelial lymphocytosis (IEl > 30/100 epithelial cells) and villous atrophy, for the validation of celiac disease. All evaluations were supervised by an experienced specialist with a minimum of five years of experience in the field post-fellowship. Information about patients was stored in a predefined assigned proforma.

SPSS.20 Software was used to perform the data analysis process. Mean + SDs were used for numerical variable such as age. Frequencies and percentages were used for categorical data such as gender, celiac disease, symptoms (head ache, abdominal pain), and residence area. Celiac disease was stratified by age, gender, symptoms, and residence area to see the effect modifiers. Post-stratification chi-square test was used, keeping p-value ≤ 0.05 considered as significant.

Results

The present study included 218 patients presenting with iron deficiency anemia. The mean age of the patients was 39.76±11.92 years. There were 119 (54.6%) male patients, and 99 (45.4%) female patients. Regarding the residence status 100 (45.9%) belonged to rural areas while 118 (54.1%) belonged to urban areas. (Table 1)

It was observed that celiac disease was diagnosed in 23 (10.6%) patients, while the disease was absent in 195 (89.4.%) patients (Table 2).

Regarding the presenting symptoms of celiac disease, out of 23 patients, only 4 (17.4%) patients experienced headache while 9 (39.1%) patients experienced abdominal pain (Table 3)

The subgroup stratification analysis showed that celiac disease was not significantly associated with age (p = 0.982), gender (0.806) and residence area (p = 0.521) (Table 4).

Table 1: Demographic profile of the patients

Demographics		Frequency	Percentage
Gender	Male	119	54.6%
	Female	99	45.4%
Residence area	Rural	100	45.9%
	Urban	118	54.1%

Table 2: Frequency of celiac disease

Celiac disease	Frequency	Percentage
Yes	23	10.6%
No	195	89.4%

Table 3: Symptoms of celiac disease

Symptoms of Celiac disease		Frequency	Percentage
Headache	Yes	4	17.4%
	No	19	82.6%
Abdominal pain	Yes	9	39.1%
	No	14	60.9%

Table 4: Stratification of celiac disease with demographics

Variables		Celiac disease				p value
		Yes		No		
		n	%	n	%	
Age distribution (Years)	20 to 35	9	39.1%	79	40.5%	0.982
	36 to 50	8	34.8%	64	32.8%	
	> 50	6	26.1%	52	26.7%	
Gender	Male	12	52.2%	107	54.9%	0.806
	Female	11	47.8%	88	45.1%	
Residence area	Rural	12	52.2%	88	45.1%	0.521
	Urban	11	47.8%	107	54.9%	

Discussion

The present study found that 10.6% of patients presenting with iron deficiency anemia had coeliac disease. This frequency is comparable to study conducted in Pakistan by Asghar and associates, they reported frequency of coeliac disease in patients with nutritional anemia 12% (10). Another Pakistani study by Shahzad and associates reported frequency of 12.99% in patients presenting with iron deficiency anemia (11).

Another study conducted in Pakistan by Hanif and associates found coeliac disease in 13.17% of patients presenting with iron deficiency anemia (12). The findings of the present study also align with the 11% reported by Khatoon et al. from Islamabad (13). These consistent figures across different regions of Pakistan suggest that coeliac disease is a common underlying cause of iron deficiency anemia in this population.

The frequency observed in this study is higher than the 7.5% reported by Bano and associates (14). This difference might be explained by variations in study, diagnostic criteria and demographic characteristics of the patients. A meta-analysis conducted by Mahadev and associates found a pooled prevalence of biopsy-confirmed coeliac disease of only 3.2% in patients with iron deficiency anemia (7). The higher frequencies seen in Pakistani studies suggest a greater burden of undiagnosed coeliac disease in this region. When compared to the pediatric population the present adult frequency of 10.6% is about half of the 21% reported by Sheikh and associates in children (15). This indicates that coeliac disease may present more commonly with iron deficiency anemia in the younger age group. Alternatively, it could reflect that many adult cases remain unrecognised or present with other symptoms.

The mean age of patients in this study was 39.76±11.92 years. This is comparable to Bano and associated who reported a mean age of 42.3±15.8 years (14). Hanif and associates found a mean age of 40.85±13.10 years (12). Shahzad and associates reported 37.65±11.26 years (11). These similar age profiles suggest that coeliac disease presenting with iron deficiency anemia is most commonly diagnosed in the third to fifth decades of life. Regarding the gender distribution, the present study found that majority patients were male, this is in contrast with several local studies (13, 14).

The symptoms observed in coeliac patients in this study were non-specific. Abdominal pain was present in 39.1% and headache in 17.4% patients. The absence of classic gastrointestinal symptoms like diarrhea or weight loss in many patients supports the notion that coeliac disease often presents atypically. Anemia can be the sole presenting feature of coeliac disease. This finding has important clinical implications (10). Reliance on gastrointestinal symptoms alone will miss a substantial number of cases.

No significant associations were found between coeliac disease and age groups, gender or residence area. This suggests that coeliac disease should

be suspected in all patients with iron deficiency anemia regardless of these demographic factors. The high frequency of coeliac disease found in this study carries several important implications. For clinicians the message is clear. Iron deficiency anemia that does not respond to oral iron supplementation should prompt serological testing for coeliac disease. Even in the absence of digestive symptoms the possibility of coeliac disease must be considered. Delaying diagnosis may lead to prolonged suffering from anemia and increases the risk of complications such as osteoporosis infertility and intestinal lymphoma.

Conclusion

It is concluded from the present study that, the frequency of celiac disease in iron deficiency anemia patients was 23 (10.6%). The study did not find significant association of celiac disease with age, gender or residence. Routine screening for celiac disease in iron deficiency anemia patients is recommended.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (Ref: No. 101/LRH/ MTI)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

SU (Postgraduate Resident)

Contributed to study design, data collection and initial manuscript drafting

Assisted in data acquisition, literature review and manuscript editing

Performed statistical analysis and contributed to interpretation of results

SZ (Professor)

Helped in methodology development, data organization and manuscript formatting

Contributed to patient recruitment, data entry and results compilation

Assisted in referencing, proofreading and final revisions of the manuscript

AM (Postgraduate Resident)

Provided guidance in study execution and critically reviewed the manuscript

Supervised the research, coordinated among authors, finalized the manuscript and approved the final version

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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