

# Frequency of Celiac Disease in Patient Presenting with Iron Deficiency Anemia Referred For Endoscopic Evaluation in a Tertiary Care Hospitals

Ayesha Hanif<sup>1</sup>, Abdul Qadir<sup>1</sup>, Maryam Arshad<sup>2</sup>, M Bilal Nasir<sup>1</sup>, Ghias Un Nabbi Tayyab<sup>3</sup> and Sikandar Maqsood<sup>1</sup>

## ABSTRACT

**Objective:** To determine the prevalence of celiac disease among patients referred for endoscopic assessment at a tertiary care hospital for the treatment of iron deficient anemia.

**Study Design:** Cross-sectional study

**Place and Duration of Study:** This study was conducted at the Department of Gastroenterology, Lahore general Hospital, Lahore during the time period from 7-2-2019 to 7-8-2019.

**Methods:** The 205 patients that were enrolled all met the inclusion criteria. A blood sample was drawn for anti-tTG level. If  $>15\text{IU/ml}$ , then patient sent for upper gastrointestinal endoscopy and duodenal biopsies and if they are significant for celiac disease, it was labeled. All data was analyzed in SPSS version 21.

**Results:** In this study the mean age of the patients was  $40.85 \pm 13.10$  years, male to female ratio of the patients was 0.79:1. The mean value of anti tTG of the patients was  $14.66 \pm 9.11$  u/ml. Among IDA patients the celiac disease found in 27(13.17%) patients.

**Conclusion:** According to this study the frequency of celiac disease is 13.2% in patient presenting with IDA who were referred for endoscopic evaluation.

**Key Words:** Iron Deficiency Anemia, Celiac Disease, Endoscopy, Patients, Hospitals

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## INTRODUCTION

The World Health Organization (WHO) defines iron deficiency anemia (IDA) as a hemoglobin level of 12 g/dL or lower for women and 13 g/dL or lower for males for more than three months in the absence of illness. Using hemoglobin as a reference, IDA is classified as moderate when hemoglobin is between 7 and 10.9 g/dL and as severe when hemoglobin is below 7 g/dL.<sup>1</sup> The incidence of IDA is higher than any other kind of anemia in people.<sup>2</sup> Celiac disease has been linked to low iron levels, an essential vitamin.

<sup>1</sup>. Department of Gerontology, Gulab Devi Hospital, Lahore.

<sup>2</sup>. Department of Dermatology, Jinnah Hospital, Lahore.

<sup>3</sup>. Department of Gerontology, Doctors Hospitals and Medical Center, Lahore.

Correspondence: Dr. Ayesha Hanif, Senior Registrar, Gulab Devi Hospital, Lahore.

Contact No: 03334966868

Email: dr.ramay@yahoo.com

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IDA may be a secondary complication of well-established celiac disease, or it might be the first thing a patient notices if they have the condition.<sup>3</sup>

Adversely affecting child morbidity, mortality, and cognitive development, IDA is a known public health concern. There is a lack of data on the real incidence of IDA and its predictors in Pakistan. Some individuals are predisposed to developing celiac disease because their immune systems develop a lifelong sensitivity to gluten.<sup>4</sup> IDA is an extra intestinal symptom of celiac disease that is often seen. Patients with iron deficiency anemia should be tested for celiac disease, according to guidelines. However, the prevalence of celiac disease among IDA patients is inconsistently reported.<sup>(1, 2)</sup> According to one research, only 7.14 percent of IDA patients suffer from celiac disease. However, another research found that the frequency of celiac disease was nearly four times higher in individuals with IDA, at 27.27%. One research found that 42% of those diagnosed with IDA also had celiac disease.<sup>5</sup>

The purpose of this research is to determine the prevalence of celiac disease among patients who arrive to a tertiary care hospital with IDA. The literature shows that the development of celiac disease in IDA patients is quite rare. However, there are conflicting reports in the literature on how common celiac disease is among people with IDA.<sup>6</sup> That's why we want to

undertake this research: so that we can use what we learn to inform future preventative and management efforts in this area.

## METHODS

The cross-sectional study was performed in the Department of Gastroenterology, Lahore general Hospital, Lahore, during the time period of 6 months i.e. 7-2-2019 to 7-8-2019. Sample size of 205 cases is calculated with 95% confidence level, 3.5% margin of error and taking expected percentage of celiac disease i.e. 7.14% in patients with IDA<sup>7</sup>. Non probability consecutive sampling methodology was used for sampling.

### Selection criteria:

**Inclusion Criteria:** Patients of age 18-60years, either gender with diagnosed IDA, defined as the presence of serum Hb  $\leq 12$  & 13 g/dL in women & men respectively with serum Fe  $< 12\mu\text{g/l}$  for  $> 3$  months in the absence of infection were enrolled into the study. The patients were referred for endoscopy.

**Exclusion Criteria:** Patients with diagnosis of celiac disease before or after detection of anemia, already taking iron supplements for IDA for  $> 6$  months were excluded from study.

**Data Collection Procedure:** Through the Outpatient Clinic of the Gastroenterology Division, 205 patients who met the study's inclusion and exclusion criteria were enrolled. Acquiring the participants' informed permission was a priority. Name, age, gender, body mass index, and IDA duration were recorded as a baseline. We used a BD 5cc syringe to collect the blood sample. For testing of anti-tTG(IgA), a sample was submitted to the hospital's pathology lab. Reports were assessed and if anti-tTG  $> 15\text{AU/ml}$ , then patient sent for upper gastrointestinal endoscopy (scalloped duodenal folds) and duodenal biopsies ( $> 25$  IELs/100 epithelial cells, crypt hyperplasia, atrophic villi) and if they are significant for celiac disease, it was labeled. All the data was recorded in performa.

**Data Analysis:** IBM-SPSS version 21 was used for data entry and analysis. Mean and standard deviation were assessed from numeric variables. Frequency and percentages were assessed from categorical variables.

## RESULTS

In this study 91 (44.39%) patients were male while 114 (55.61%) patients were female. Male to female ratio of the patients was 0.79:1. Out of 205 iron deficiency anemic patients the celiac disease found in 27 (13.17%) patients. Out of 205, scalloped duodenal folds were present in 27 (13.17%) cases,  $> 2$  SIEL were present in 27 (13.17%) cases, crypt hyperplasia in 27 (13.17%) cases and atrophic villi in 27 (13.17%) cases. The resulted values are presented in Table 1.

The study results showed that among patients with age  $\leq 30$  years, the celiac disease noted in 10 (16.1%) patients whereas among patients with age  $> 30$  years the celiac disease noted in 17 (1.9%) patients and this was found to be significant (p-value = 0.410). According to this study among male patients, the celiac disease noted in 12 (13.2%) patients whereas among female patients the celiac disease noted in 15 (13.2%) patients and this was noted as insignificant (p-value = 0.995). The study results showed that among patients with duration of IDA  $\leq 3$  years, the celiac disease noted in 7 (7.1%) patients whereas among patients with duration of IDA  $> 3$  years the celiac disease noted in 20 (8.7%) patients and this was found to be significant (p-value = 0.015). The study results showed that among patients with normal BMI patients the celiac disease noted in 13 (11.7%) patients whereas among patients with overweight & obese BMI the celiac disease noted in 14 (22.6%) patients and this was observed as significant (p-value = 0.002). The numerical values are shown in Table 2.

**Table No.1: Basic demographics of patients enrolled into the studies (n = 205)**

Values		Frequency	Percent	
Gender	Male	91	44.39%	
	Female	114	55.61%	
Celiac disease	Yes	27	13.17%	
	No	178	86.83%	
Tests performed to detect celiac disease	Scalloped duodenal folds	Present	27	13.2%
		Absent	178	86.8%
	> 2 SIEL	Present	27	13.2%
		Absent	178	86.8%
	Crypt hyperplasia	Present	27	13.2%
		Absent	178	86.8%
	Atrophic villi	Present	27	13.2%
		Absent	178	86.8%

**Table No.2: Comparison of celiac disease in different groups**

Values		Celiac Disease		p-value
		Yes	No	
Age (years)	$\leq 30$	10	52	0.410
		16.1%	83.9%	
	$> 30$	17	126	
		1.9%	88.1%	
Gender	Male	12	79	0.995
		13.2%	86.8%	
	Female	15	99	
		13.2%	86.8%	
Duration of IDA (years)	$\leq 3$	7	91	0.015
		7.1%	92.9%	
	$> 3$	20	87	
		18.7%	81.3%	
BMI	Underweight	0	32	0.002
		0.0%	100.0%	
	Normal	13	98	
		11.7%	88.3%	
	Overweight & obese	14	48	
		22.6%	77.4%	

## DISCUSSION

Gluten is a protein found in wheat, barley, and rye that triggers an immunological response in persons who are genetically predisposed to developing celiac disease. Failure to thrive, malabsorption, diarrhea, weight loss, vomiting, odd feces, and abdominal distention are all symptoms traditionally associated with celiac disease, which was thought to be an intestinal illness of infancy and adulthood. Celiac disease is characterized by IDA. Patients referred for evaluation of IDA had Celiac disease identified in 0% to 8.7% of studies employing serologic testing and small-bowel biopsies.<sup>8</sup>

The prevalence of celiac disease in our research was 27 (13.2%) among individuals who presented with iron deficiency anemia. Celiac disease was more prevalent in the younger age group (40 years old; 24 (75%); mostly female (22 (68.75%); and more prevalent in the Kashmiri community<sup>9</sup> ( $p=0.0002$ ). According to one research, only 7.14 percent of IDA patients suffer from celiac disease.

According to the findings of one research by Shahzad, Amir et al., Anti-tTG antibodies were positive in 27.27% of patients, while anti-endomysia antibodies were positive in 16.88% of cases.<sup>8</sup> Prevalence About 12.99% (10/77) of the individuals who had underlying IDA were identified to have simultaneous celiac disease at the time of presentation. Patients with IDA were surveyed in Iran by an other author Mahmud Baghbanian et al to determine the prevalence of celiac disease.<sup>2</sup> Forty-two of the 402 IDA patients tested positive for celiac disease antibodies. All patients with a positive serology had pathological abnormalities (Marsh I, II, and III) in their small intestinal biopsies.<sup>10-11</sup> They determined that anti-tissue transglutaminase antibody screening for celiac disease should be performed routinely in individuals with IDA. Celiac disease may be a rare or common finding in patient with IDA. A prospective research conducted in Isfahan (Iran) and found that 13 patients (10%) were diagnosed with celiac disease.<sup>12</sup> The prevalence of celiac disease was 14.6% among 4120 IDA patients in research done in Tehran, Iran.<sup>13</sup> Another Iranian research found that 6.3% of IDA patients also had celiac disease. Prevalence rates of 8.7% and 8.33% were found in American and Turkish research, respectively.<sup>(3,4)</sup> The selection of patients and the frequency of celiac disease in different regions may also contribute to this discrepancy.

Another researcher found that celiac disease often had IDA as one of its first symptoms. Iraqi Medical Conference Transcripts, Volume 37. The author reported that 33.3% of anemic people with iron deficiency had celiac disease. However, another research found that the frequency of celiac disease was nearly four times higher in individuals with IDA, at

27.27%. However, one research found that 42% of those diagnosed with IDA also had celiac disease.<sup>14</sup> Srihari Mahadev et al<sup>5</sup> found a very low rate of celiac disease in their sample of IDA patients. They found 18 papers with a total of 2998 IDA patients to include in their analysis. Research was conducted in a variety of countries, including the UK, USA, Italy, Turkey, Iran, and Israel. Celiac disease had a crude un-weighted prevalence of 4.8% ( $n=143$ ).<sup>15</sup> The prevalence of biopsy-confirmed celiac disease in individuals with IDA was 3.2% (95% confidence range = 2.6-3.9), according to our weighted pooled analysis. However, there was a lot of diversity ( $I^2=67.7\%$ ).<sup>16</sup>

## CONCLUSION

This research found that 13.2% of patients with IDA who were referred for endoscopy also had celiac disease. The debate is gone, and the number of people diagnosed with celiac disease is small, but not negligible. The findings of this research will be used in the future to inform preventative and management strategies.

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### Author's Contribution:

Concept & Design of Study:	Ayesha Hanif
Drafting:	Abdul Qadir, Maryam Arshad
Data Analysis:	M Bilal Nasir, Ghias Un Nabbi Tayyab, Sikandar Maqsood
Revisiting Critically:	Ayesha Hanif, Abdul Qadir
Final Approval of version:	Ayesha Hanif

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