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Celiac Disease among Outpatient Attendees with Gastrointestinal Complaints at a Tertiary Care Hospital in Sana'a City, Yemen: A Four-Year Retrospective Study

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ABSTRACT

Background: Celiac disease (CD) is a chronic autoimmune enteropathy, which is caused by gluten in people with genetic predisposition regardless of age and gender. Its presentations can vary from asymptomatic nature to severe malnutrition. Diagnosis usually depends on serology and intestinal biopsy examination. This study aimed to determine the prevalence of CD and describe its clinical presentations and diagnostic approaches among patients with gastrointestinal complaints in Sana'a City, Yemen.

Methods: A retrospective, cross-sectional study was conducted using the medical records of patients diagnosed with CD at the University of Science and Technology Hospital (USTH) from January 2020 to December 2023. Out of 350 records for CD patients diagnosed during the study period, 155 records were complete and were used in describing the clinical presentations and diagnostic methods of CD among Yemeni patients. Data about sociodemographic characteristics, clinical presentations and diagnostic methods were collected using a pre-designed data collection sheet. Descriptive statistics were used to summarize the collected data.

Results: Out of 160,000 patients attending the Gastroenterology Outpatient Department at the USTH from 2020 to 2023, 350 were diagnosed with CD, yielding a prevalence of 0.22%. The mean age of CD patients was 26 ± 14.6 years, with a majority being female (71%) and over half (54.8%) falling within the 20-40 age group. Clinically, more than half of the patients presented with abdominal pain (52.9%) and diarrhea (50.3%), followed by abdominal distention (25.8%) and weight loss (21.9%). Less frequent typical symptoms included vomiting (17.4%), anorexia (12.9%), and constipation (7.7%). Among atypical manifestations, fatigue and failure to thrive (9% each) were the most common, followed by anemia (7.7%), while rickets, bruising, and delayed puberty were rare (0.6% each). Diagnostic evaluation revealed that 78.4% of 87 patients tested were positive for anti-tissue transglutaminase antibodies, and 91% of 111 patients who underwent intestinal biopsy showed characteristic mucosal changes consistent with CD.

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Conclusion: The prevalence of CD among patients with gastrointestinal complaints is low, compared to the global and regional trends of the disease, predominately affecting females. It mostly presents with typical gastrointestinal symptoms, particularly abdominal pain, diarrhea and distension. Although atypical non-gastrointestinal manifestations are infrequent, CD should be considered when dealing with patients having non-gastrointestinal problems. Healthcare providers should be educated about the importance of incorporating both serology and intestinal biopsy examination for the diagnosis of patients with suspected CD.

Keywords: Celiac disease ▪ Gastrointestinal complaint ▪ Outpatient attendee ▪ Yemen

1. Introduction

Celiac disease (CD) is a chronic autoimmune enteropathy, leading to malabsorption.[1] It is induced by the consumption of gluten, the primary protein in wheat and barley, in genetically predisposed individuals.[2] CD affects people of any age or gender and can be asymptomatic or lead to severe malnutrition.[2] The overall prevalence of CD in the general population falls between 0.5% and 2% in most countries, averaging around 1%.[2] However, many people suffer for years before getting a correct diagnosis in celiac disease.[3]

Clinically, CD symptoms are extremely diverse and can be divided into intestinal and extra-intestinal symptoms. Intestinal symptoms include abdominal pain, chronic diarrhea, and children's failure to thrive, and extra-intestinal symptoms include nutrient deficiencies, neurological and psychiatric disorders, enamel defects, liver abnormalities, joint problems, and dermatitis herpetiformis.[4–6] Nevertheless, a substantial proportion of patients exhibit atypical symptoms or no symptoms despite having an abnormal intestinal mucosa and CD-specific serum antibodies (referred to as asymptomatic CD), or they may only CD-show specific serum antibodies without intestinal damage (referred to as potential CD).[7]

Diagnosis of CD usually depends on serology and is often confirmed by intestinal biopsy. Its diagnostic scheme is usually based on clinical history and the presence of typical symptoms, detection of CD-specific antibodies using serological tests, histopathological examination of biopsies from the small intestine, and response to a gluten-free diet.[7, 8] According to the guidelines of the European Society of Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN), the diagnosis of CD in symptomatic young children can be established with positive serology without the need for intestinal biopsy examination.[9]

In Yemen, there is a lack of knowledge about CD, with no studies investigating its prevalence, clinical presentation, diagnostic approaches and management strategies. This knowledge gap is challenging for healthcare providers in diagnosing and treating CD, as well as for patients who might go undiagnosed or misdiagnosed. The limited availability of serological testing for anti-tissue transglutaminase (anti-tTG) antibodies or histopathologic examination of endoscopic biopsy, further complicates the situation. Therefore, this study aimed to determine the prevalence of CD and describe its clinical presentations and diagnostic approaches among patients with gastrointestinal complaints in Sana'a City, Yemen.

2. Methods

2.1. Study design, population and setting

A retrospective, cross-sectional study was conducted using the medical records of patients diagnosed with CD at the University of Science and Technology Hospital (USTH), a private tertiary care hospital in Sana'a, from January 2020 to December 2023. Out of 350 records for CD patients diagnosed during the study period, 155 records were complete

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and were used in describing the clinical presentations and diagnostic methods of CD among Yemeni patients. Records with incomplete data were excluded from the study of clinical presentations and diagnostic approaches.

2.2. Data collection

Data about sociodemographic characteristics, clinical presentations and diagnostic methods were collected using a pre-designed data collection sheet. Clinical presentations were divided into two categories: typical (diarrhea, abdominal pain, weight loss, abdominal distention, vomiting, anorexia, constipation, and edema) and atypical (osteoporosis, hair loss, neurological symptoms, infertility, anemia, immunological symptoms, dermatitis herpetiformis, rectal prolapse, clubbing, fatigue, failure to thrive, short stature, rickets, bruising, amenorrhea, delayed puberty, and impotence). The methods used for diagnosing CD (anti-tTG IgA and biopsy) were also recorded.

2.3. Data analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 24.0 (IBM Corp., Armonk, NY, USA). Continuous variables were described using the mean and standard deviation (SD) for normally distributed data, while categorical variables were presented as frequencies and percentages.

3. Results

3.1. Prevalence of CD

Out of 160,000 patients who attended the Gastroenterology Outpatient Department of the USTH from 2020 to 2023, 350 were diagnosed with CD, resulting in a CD prevalence of 0.22%.

3.2. Sociodemographic characteristics of CD patients

The mean age of CD patients was 26 ± 14.6 years. The majority of patients were females (71%), and more than half were aged from 20 to 40 years (54.8%) (Table 1).

Table 1: Sociodemographic characteristics of CD patients attending the USTH in Sana'a, Yemen (2020–2023)*

Variable	*n* (%)
Gender	
Male	45 (29.0)
Female	110 (71.0)
Age (years)	
Mean ± SD: 26 ± 14.6	
<20	47 (30.4)
20–40	85 (54.8)
>40	23 (14.8)

* The total number of patients was 155. CD, celiac disease; USTH, University of Science and Technology Hospital; SD, standard deviation.

3.3. Clinical manifestations of CD patients

Table 2 shows that more than half of CD patients had abdominal pain (52.9%) and diarrhea (50.3%), followed by abdominal distention (25.8%), and weight loss (21.9%). However, vomiting (17.4%), anorexia (12.9%), and constipation (7.7%) were the least frequent typical manifestations exhibited by patients. On the other hand, fatigue (9%) and failure to thrive (9%) were the most frequent atypical manifestations in CD patients. Other atypical manifestations ranged from 0.6% for rickets, bruising and delayed puberty to 7.7% for anemia.

3.4. Laboratory findings in CD patients

Table 3 shows that out of 87 patients (56.1% of 155 patients) who were examined by serological tests, 78.4% were positive for anti-tTG IgA antibodies. On the other hand, out of 111 patients (71.6% of 155 patients) who underwent intestinal biopsy examination, 91% had a positive biopsy result indicating the presence of characteristic changes in the intestinal mucosa associated with CD.

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Table 2: Clinical manifestations of patients with CD attending the USTH in Sana'a, Yemen (2020–2025)*

Clinical manifestations	*n* (%)
Typical	
Abdominal pain	82(**52.9**)
Diarrhea	78(**50.3**)
Abdominal distention	40(**25.8**)
Weight loss	34(**21.9**)
Vomiting	27(**17.4**)
Anorexia	20(**12.9**)
Constipation	12(**7.7**)
Atypical	
Fatigue	14(**9.0**)
Failure to thrive	14(**9.0**)
Anemia	12(**7.7**)
Neurological symptoms	10(**6.5**)
Immunological symptoms	8(**5.2**)
Short stature	7(**4.5**)
Osteoporosis	6(**3.9**)
Dermatitis herpetiformis	4(**2.6**)
Rickets	1(**0.6**)
Bruising	1(**0.6**)
Delayed puberty	1(**0.6**)

* The total number of patients was 155.

Table 3: Serological and intestinal biopsy findings among patients with CD attending the USTH in Sana'a, Yemen (2020–2025)

Diagnostic approach	*N*	*n* (%)
Serological test for anti-tTG antibodies	87	76 (**87.4**)
Intestinal biopsy examination	111	101 (**91.0**)

N, number examined by the corresponding method; *n*, number positive; CD, celiac disease; USTH, University of Science and Technology Hospital; tTG, tissue transglutaminase.

4. Discussion

To the best of our knowledge, this is the first study to document cases of CD among patients with gastrointestinal complaints seeking healthcare in Sana'a. The findings reveal a CD prevalence of 0.22% among 160,000 patients, which is lower than the global average of approximately 1.4% concluded in a previous systematic review and meta-analysis.[3] However, the low proportion in the present study should be interpreted with caution because discrepancies in prevalence could result from differences in awareness of CD and diagnostic approaches. A recent systematic review on the epidemiology of CD in Arab countries revealed differences in the prevalence of the disease, ranging from 0.14% in Tunisia to 3.2% in Saudi Arabia.[10] A higher rate of 2.7% has been more recently reported among pediatric patients in the United Arab Emirates.[11] A prevalence of 5.9% was reported among patients with iron deficiency anemia in the northwest of Saudi Arabia,[12] and a much higher rate of 10% was reported for CD among children with type 1 diabetes mellitus in Morocco.[13] It is noteworthy that the present study did not investigate the conditions associated with CD, and further studies are suggested to determine the prevalence of CD among high-risk population groups. The higher proportion of females affected by CD in the present study aligns with the regional and global trends of the disease. For instance, a systematic review of CD in the Arab countries shows that women generally have a higher prevalence of CD compared to men.[10] Likewise, 66% of children with CD in Kuwait were females,[14] and 54.9% were females in Saudi Arabia.[15]

CD presents with a spectrum of manifestations, with typical manifestations primarily involving gastrointestinal symptoms and atypical manifestations including a range of extra-intestinal symptoms that can complicate diagnosis and management. The clinical presentation of CD among patients in the present study was predominantly characterized by typical gastrointestinal symptoms, with abdominal pain (52.9%), diarrhea (50.3%), abdominal distention (25.8%), and weight loss (21.9%) being the most common. In Kuwait, failure to thrive was the most common presentation among 72% of children with CD, followed by chronic diarrhea (64%) and abdominal distension (56%).[14] In Saudi Arabia, inadequate weight gain (54%), abdominal pain (59.3%), distention (46.1%) and diarrhea (41.6%) were the most commonly presenting symptoms of CD among children.[15] In western Iran, abdominal pain (77.8%), constipation (59.3%) and diarrhea (54.9%) were the

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most common gastrointestinal manifestations of CD.[16] In general, the gastrointestinal manifestations observed among patients with CD in the present study are more or less consistent with those reported elsewhere.[17-19]

Atypical manifestations, though less frequent, were also observed among patients with CD in the present study, with fatigue and failure to thrive (9% each) and anemia (7.7%) being the most common. These findings underscore the systemic nature of CD, which can affect multiple extraintestinal organ systems. A study in Iran showed that anemia (36.4%) and decreased bone age (35%) were the most frequent non-gastrointestinal symptoms among children with CD.[20] In Kuwait, 5.2% of children and adolescents with CD were found to have both stunting and wasting.[21] These atypical symptoms highlight the need to take CD into account in patients with non-gastrointestinal problems, especially in areas where it can be inadequately diagnosed.

From the diagnostic perspective, patients underwent confirmation by serological testing for anti-tTG and/or intestinal biopsy examination. However, most cases were diagnosed by biopsy examination. A significant proportion of cases did not undergo testing by both methods, being approximately 44% for serological testing and 28% for biopsy examination. The intestinal biopsy, the gold standard for CD diagnosis, was positive in 91% of the 111 patients who underwent the procedure, confirming its high diagnostic accuracy. These gaps in diagnostic evaluation highlight the need for improved access to diagnostic tools and increased awareness among healthcare professionals to ensure accurate diagnosis of CD.

This study is limited by its retrospective design, small sample size and being conducted at a single health facility, and many records were not included in data analysis, which may affect the generalizability of its findings to the broader population. However, it provides preliminary data on the epidemiology of CD among patients with gastrointestinal complaints and highlights the clinical and diagnostic challenges associated with CD in a resource-limited setting like Yemen. It is recommended that larger-scale prospective studies be conducted in the general population and among specific high-risk groups to provide deeper understanding of the epidemiology of the disease in the country.

5. Conclusion

The prevalence of CD among patients with gastrointestinal complaints is low, as confirmed by serology and intestinal biopsy examination, compared to the global and regional trends of the disease. It predominates among females and is mostly presented with typical gastrointestinal symptoms, particularly abdominal pain, diarrhea and distension. Although atypical non-gastrointestinal manifestations are infrequent, CD should be considered when dealing with patients having non-gastrointestinal problems. There is a need to raise the awareness of healthcare providers of the importance of incorporating both serology and intestinal biopsy examination for the diagnosis of patients with suspected CD.

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Ethical approval and consent

This study was ethically approved by the Research Ethics Committee of the Faculty of Medicine and Health Sciences at the University of Science and Technology, Sana'a, Yemen. In addition, permission was obtained from the administration of the USTH. Patient information was handled confidentially and securely by the researchers.

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Conflict of Interest

The authors declare no conflict of interest associated with this article.

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