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Original Article

Demographic and Clinical Profiles of Children with Celiac Disease Attending Paediatrics Department of Bangladesh Medical University

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Abstract:

Background: *Coeliac disease (CD) is an autoimmune disorder triggered by gluten in genetically predisposed individuals. While traditionally associated with Western populations, CD is increasingly recognized in South Asia, including Bangladesh.*

Materials & Methods: *A descriptive, cross sectional study was conducted at BMU from July 2022 to June 2025 to see demographic and clinical profiles of celiac disease in our country. A total of 62 children (age <18 years) attending the Paediatrics department of BMU with suspected celiac disease were initially enrolled for the study. Out of 62 children with suspected celiac disease, 35.5% (22) were positive for IgA anti-tTG and were finally included in the study to find out their demographic and clinical profiles.*

Results: *Among studied children female were 31.81% and male 68.18%. Mean age of all children with tTG positive group was 10.30 ± 4.10. The age group, 10-14 year showed the highest (50%) prevalence of positive anti-tTG. Maximum (63.64%) children came from middle income class family. The common presentation among the positive anti-tTG (IgA) children seen were chronic diarrhea (90.90%), followed by abdominal pain (68.18%), abdominal distension (54.54%), feeling of gas accumulation in the abdomen (45.45%), weight loss (22.72%) and vomiting (18.18%). Unexplained failure to thrive was present in 8(36.3%) patients. Four (4) patients (18.18%) were with short stature, anemia was present in 6 patients (27.27%). Among 22 seropositive patients, histological changes compatible with CD were found in 19 (86.3%) cases and normal in 3 cases.*

Conclusion: *In conclusion, Screening for celiac disease may be included in diagnostic tests for evaluating children presented with chronic diarrhea, abdominal pain and/or short stature.*

Keywords: Celiac disease, Tissue transglutaminase, Distal part of duodenum.

Introduction:

Celiac disease (CD) is an immune-mediated disorder characterized by small intestinal mucosal injury and malabsorption caused by sensitivity to dietary gluten and related proteins in genetically susceptible individuals.[1] It is prevalent in both children and adults and female/male ratio is 2:1.[2]

Global prevalence is approximately 1-5% of the general

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population[1]. Prevalence varies from 0.14% to 1.17% in low risk (healthy general population) and from 2.4% to 44% in high risk populations (1st degree relatives, short stature, type I diabetes mellitus, Down's syndrome etc).[3] Among a sample of 2000 healthy blood donors, the serological prevalence was 0.6% in Iran and 1.3% in Turkey.[4,5] The prevalence in Western nations varies from 1 in 130 to 1 in 300 individuals & in the United States 1 in 133.[6] The highest prevalence in the Saharawi people of Africa is around 5 percent.[7] Celiac disease affecting patients is now well recognized in Northern India and prevalence is 1 in 96 (1.04%).[8]

Celiac disease may present with chronic diarrhoea (80-94%), abdominal pain or distension (87%), failure to thrive (81%), short stature (60%), anorexia (84%) and fatigue but it may be entirely symptomless (50%). Diarrhoea is still the most common presenting symptom.[9-11] Based on the clinical features, serology and biopsy, Celiac disease is classified as: 1. ***Classical celiac disease*** (symptomatic, dominated by gastrointestinal malabsorption with positive serology and villous atrophy) 2. ***Atypical Celiac disease*** (with prominent extraintestinal symptoms-short stature, iron deficiency anaemia, osteoporosis, neuropathy, dermatitis herpetiformis etc., a few or no gastrointestinal symptoms with positive serology and limited abnormalities of small intestinal mucosa) 3. ***Silent Celiac disease*** (asymptomatic, positive serology & villous atrophy) and 4. ***Latent Celiac disease*** (asymptomatic, positive serology but normal duodenal biopsy).[12,13]

It is likely that serology could identify CD in its early stages, before the appearance of a severe intestinal damage. The best strategy for CD serological screening are the detection of Anti tissue transglutaminase antibody (Anti-tTG IgA) and Anti endomysial antibody. The Anti-tTG (IgA) is currently the test of choice. In children, the pooled estimates of sensitivity and specificity were 93.1% and 96.3% respectively.[12] Serum Anti-tTG (IgA) level may not be elevated in patient with deficient IgA, so serum IgA level must also be measured in seronegative cases to avoid a false negative result. The small intestinal biopsy is considered the gold standard for diagnosis of CD using the modified Marsh criteria.[12]

The only treatment for Celiac disease is lifelong exclusion of gluten from diet. Celiac disease may be associated with intestinal lymphoma and other forms of small intestinal cancer. Several follow-up studies suggest that a gluten-free diet protects from cancer development, especially if started in the 1st year of life.[14]

In the past, coeliac disease was thought to be an European disease, but recently, in developing countries, including South Asia, coeliac disease has become a wide spread public health problem.[15] In a study done in slum area of Dhaka, screening test for celiac disease was positive in 0.6%.[16] But actual prevalence of celiac disease is not yet identified by a large scale study. Therefore the aim of this study was to describe the demographic and clinical profiles of children with celiac disease attending at Paediatrics department of Bangladesh Medical University (BMU).

Materials & Methods:

This cross sectional, descriptive study was carried out during the period of July 2022 to June 2025 in the Department of Paediatrics, BMU, Shahbag, Dhaka, Bangladesh.

Within 36 months of study period, 62 children (age <18 years) attending the Paediatrics department of BMU having suspected clinical features of celiac disease (chronic diarrhea, abdominal pain, failure to thrive, short stature etc) were initially enrolled for the study. The patients were selected by purposive type of sampling technique. The children who had contraindications to upper GI endoscopy and refused to do endoscopy were excluded from the study.

Patient's clinical characteristics retrieved from medical interview, physical examinations and careful analysis of patient's records. Parents and the patients were informed about the nature of the study, its usefulness and its consequences. Informed written consent were taken from the patients and parents. All data collection was performed by the researcher herself according to a self developed data collection sheet. Blood samples were collected from all patients in a standardized manner. Samples were analyzed for hematological parameters (including Hb% and total leukocyte count) by Auto analyzer. Serum IgA anti-tTG was measured by ELISA methods. In those patients who were positive for tTG (titer of >50 iu/mL) were included in the study and were selected for upper GI endoscopy and biopsy from second part of duodenum.

After 6-8 hours of fasting condition, endoscopy of upper GIT was performed using an Olympus forward viewing video endoscope under topical lignocaine anesthesia. During endoscopy, at least 2 biopsy samples were taken from duodenum and kept in a formalin filled

test tube and were sent to the pathology department for histopathology. The endoscope & biopsy forceps were carefully cleaned and disinfected by immersing the scope in 2% glutaraldehyde for 20 minutes and then rinsing it with clean water. After half an hour of endoscopy and biopsy, patients were allowed to take at first liquid then semisolid and normal diet orally. The small intestinal biopsy is considered the gold standard for diagnosis of CD using the modified Marsh criteria.[17]

Statistical analyses were performed using SPSS (version 15). Frequency with proportion was used to summarize categorical variables and mean with SD was used for symmetric quantitative variables. A child is said to be short stature if their height is below the 3rd percentile (or -2 SD) on standard growth charts (CDC growth chart). Results will be presented as appropriate table.

Results:

A total of 62 children presenting with chronic diarrhea and/or abdominal pain, unexplained failure to thrive, short stature were evaluated for celiac disease.

In serological test of children, 22 (35.5%) were positive for anti-tTG (IgA) and were included in the study, of whom female were 7 (31.81%) and male 15 (68.18%). Mean age of all children with tTG positive group was 10.30 ± 4.10, with the majority (50%) cases were in 10-14 year age group. Of the studied children, 63.64% were in middle class group, 27.27% were in low income group and only 9.09% were in high income group. Most children were from urban areas (81.81%). There were no children with family history of coeliac disease (Table 1).

Table 1: Distribution of children with coeliac disease according to demographic profiles (N=22).

Variable	Number of children (%)
Age group (In years)	
>5	02 (9.09)
5-9	05 (22.72)
10-14	11 (50)
14-18	04 (18.18)
Mean±SD	10.30 ± 4.10
Sex	
Male	15 (68.18)
Female	07 (31.81)
Residence	
Urban	18 (81.81)
Rural	4 (18.18)
Socioeconomic status	
Low	6 (27.27)
Middle	14 (63.64)
High	2 (9.09)
Family history of coeliac disease	
Present	0 (0)
Absent	22 (100)

The most common presentation among the positive anti-tTG (IgA) children seen was chronic diarrhea, present in 20 (90.90%) patients (Table-2). The other symptoms were abdominal pain 15 (68.18%), followed by abdominal distension 12 (54.54%), feeling of gas accumulation in the abdomen 10 (45.45%), weight loss 5 (22.72%) and vomiting 4 (18.18%). Unexplained failure to thrive was present in 8 (36.3%) patients. Four patients (18.18%) were with short stature, anemia was present in 6 patients (27.27%).

Table 2: Distribution of children according to clinical features at presentation (N=22)

Characteristics	Number of children (%)
Chronic diarrhea	20 (90.90)
Abdominal pain	15 (68.18)
Abdominal distension	12 (54.54)
Feeling of gas accumulation in abdomen	10 (45.45)
Failure to thrive	8 (36.3)
Short stature	4 (18.18)
Weight loss	5 (22.72)
Vomiting	4 (18.18)
Anaemia	6 (27.27)

Endoscopic appearance was normal in 10 (45.45%) patients, mosaic pattern of duodenal mucosa in 1(4.55%) patient, scalloping of the mucosal folds in 8 (36.36%) patients and loss of duodenal folds in 3 patients.

Among 22 seropositive patients, histological changes were found in 19 (86.3%) cases and normal in 3 (13.7%) cases. Of the 19 cases, histological changes of 3c category of Marsh were found in 3 (15.8%), 3b in 4 (21.1%) and 3a in 12 (63.2%) cases (Table-3).

Table 3: Distribution of patients according to Marsh criteria (M=19)

Marsh Type	Number of children (%)
3a	12 (63.2)
3b	04 (21.1)
3c	03 (15.8)

Discussion

Celiac disease (CD) is an autoimmune enteropathy triggered by the ingestion of gluten-containing grains in susceptible individuals. The onset of symptoms in the classic form generally occurs between 6 and 18 months of age.[18] This form is typically characterized by chronic diarrhea, failure to thrive, anorexia and muscle wasting. Diarrhea is the main presenting feature of CD.[12] Although CD was once thought to be a rare disease, recent screening studies indicate that CD is one of the more frequent genetically based disease, occurring 1 in 100 to 200 people worldwide.[13] Little is known about the prevalence of CD in children in Bangladesh. This study highlights the demographic and clinical profiles of children with celiac disease attending the Paediatrics department, BMU.

In the present study, mean age at diagnosis of 22 children was 10.30 ± 4.10 years. It was found that most of the children (35.5%) were in 10-14 year age group. In a study in India, reported age at diagnosis of CD was 6.3 to 8.6 (range 2.5 to 14) years,[12] and which is similar to the present study. On the other hand, children with CD in the Western countries, classically present between 6 to 18 months of age and majority are diagnosed by two years of age.[19] In present study, age at diagnosis of CD is higher, this might be due to multiple causes. Probably the actual age at presentation of CD in our country is relatively higher or it may be due to late presentation of these patients to a tertiary care hospital.

In the present study, Out of 22 patients with positive anti-tTG (IgA), male were 15 and female 7. In the present study, boys were more likely than girls to had CD which is not identical to the findings reported in Sahara.[7] Another study had also shown that a higher proportion of females were found to be positive for CD as compared to males[8]. In the present study it is shown that sample size of male patients was greater in relation to female. This may be due to under-reporting of symptoms in female patients in our country.

The most common presentation seen was chronic diarrhea present in 90.90% of patients. Findings of present study are consistent with the findings of a previous study done in hospitalized patients with chronic diarrhea in India, where CD has been diagnosed in > 80% cases.[11] The other symptoms were abdominal pain (68.18%), followed by abdominal distension (54.54%), feeling of gas accumulation in the abdomen (45.45%), weight loss (22.72%) and vomiting (18.18%). Unexplained failure to thrive was present in 36.3% patients. Four (4) patients (18.18%) were with short stature, anemia was present in 6 patients (27.27%).

In the present study, out of 22 seropositive patients, histological changes compatible with CD were found in 19 (86.3%) cases and normal in 3 cases. Histological changes were of 3a category of Marsh in 12 (63.2%) cases, 3b in 4 (21.1%) and 3c in 3 (15.8%) cases. No patients fulfilled Marsh 1 and 2 criteria. In a study that was done in 4 cities in China, it has been reported that 2 patients with positive serology had no mucosal lesions.[10] One explanation regarding this finding may be that, a patient may have celiac disease with normal duodenal biopsy, and it may be due to patchy involvement of the duodenum. Another possibility is that a patient may have latent CD together with some degrees of gluten sensitivity. Another study done in India, it has been reported that a good proportion of Indian children with CD had mild to moderate histological changes (Marsh 1 and 2).[11] But in the present study, no patient was found with Marsh 1 or 2 stage. This may be due to late presentation of the cases.

This study identifies a high proportion (35.5%) of CD in children presenting with chronic diarrhea and/or failure to thrive, short stature using serology. These findings suggest that performing a routine screening for CD by serological test (IgA anti-tTG) followed by diagnostic biopsy among seropositive cases can identify CD in its earlier stage and this can prevent or delay more complicated life threatening and terminal complications. Early screening and identification of CD in at-risk groups can increase the level of awareness and capacity of physicians in recognizing various clinical presentations of CD and allow them to treat patients accordingly.

Conclusion:

Coeliac disease is one of the most important causes of chronic diarrhea, abdominal pain or distension and unexplained failure to thrive in our children which often remains undiagnosed. Early detection of this disease can prevent many of its unwanted complications. Although awareness is improving, substantial diagnostic delays

persist. Strengthening clinical recognition and expanding serological testing helps in early diagnosis of coeliac disease in our community.

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Conflict of interest:

There is no conflict of interest.

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