

## ORIGINAL ARTICLE

## COELIAC DISEASE IN CHILDREN PRESENTING WITH FAILURE TO THRIVE

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**Background:** Coeliac disease used to be considered as a disease of European and Western population but now it has emerged as a global problem. Objective of this study was to evaluate the frequency and mode of presentation of coeliac disease in children presenting with failure to thrive. **Methods:** This cross-sectional descriptive study was conducted at Paediatrics Department of Madina Teaching Hospital in collaboration with Histopathology Department of University Medical and Dental College, Faisalabad over a period from April 2010 to March 2011. A total of 60 children, aged 4–6 years presenting as failure to thrive according to their height and weight, were included. Relevant investigations were done along with radiological assessment of bone age. The jejunal biopsy was taken in all the patients. Children who were suffering from primary or secondary malnutrition due to other chronic illnesses and malabsorptive syndromes were excluded from the study. The data was analysed using SPSS-17. Chi-square test was used and  $p < 0.05$  was considered significant. **Results:** Total 60 children, 4–16 years of age were included in the study. Twenty-four (40%) children were diagnosed as coeliac disease by jejunal biopsy showing Marsh Grade-3. Male/female ration was 1.5:1. The most frequent symptom among these coeliac patients was abdominal distension (75%,  $p=0.041$ ), followed by pallor. (71%,  $p=0.048$ ). Anaemia (Hb<12 gm/dl) was found in all 24 patients. **Conclusion:** Coeliac disease is increasingly being recognised as presenting with atypical presentation like short stature, failure to thrive, unexplained anaemia, rickets, abdominal distension and abdominal pain.

**Keywords:** Coeliac disease, Failure to thrive, Mixed Deficiency Anaemia

### INTRODUCTION

Coeliac disease (CD) is now believed to be the most common genetically predetermined condition in humans.<sup>1,2</sup> Previously coeliac disease used to be considered as the disease of European and Western population but now it has emerged as a global problem.<sup>3</sup>

The prevalence of coeliac disease in children between 2.5 and 15 years in the general population ranges from 3–13/1,000 children based on studies in Europe and US.<sup>4</sup> Major Advances in the understanding of this disease have expanded it from a gastrointestinal disease with diarrhoea and malabsorption to a multi-system immunological disorder.<sup>5</sup>

Presumed disease is best detected by serologic screening for the presence of IgA antibodies specific for tissue transglutaminase and endomysium, this should be followed by biopsy of the mucosa of small intestine to establish the ultimate diagnosis.<sup>6</sup> In Immunoglobulin, A deficient patients which is 10–15 times more common in patients with CD, immunoglobulin G (IgG) antibodies should be determined.<sup>7</sup>

Because of the major implications of a diagnosis of coeliac disease, professional guidelines recommend that a positive serological test is still followed by an endoscopy and biopsy. It is recommended that, a negative serology test may still be followed by endoscopy and duodenal biopsy if clinical suspicion remains high due to the 1 in 100 ‘false-negative’ result. As such, tissue biopsy is still considered the gold standard in the diagnosis of coeliac

disease.<sup>8–10</sup> The characteristic histopathological changes have been classified by Marsh and graded from 0–4 according to the severity of the findings.<sup>11</sup> These include from totally normal mucosa (Marsh 0) to partial or total villous atrophy, crypt elongation and decreased villous/crypt ratio, increased intraepithelial lymphocytes, intraepithelial lymphocyte mitotic index  $>0.2\%$ , decrease height of epithelial cells, and loss of nuclear polarity (Marsh 4).<sup>4</sup>

Over the past 20 years, the incidence, age of presentation and features of CD in children have changed considerably. In the past, CD usually presented either very early in life, between 9 and 24 months, or in 3<sup>rd</sup> or 4<sup>th</sup> decade of life.<sup>8,13–16</sup> Infants and toddlers presented primarily with gastrointestinal manifestations and malabsorption characterised by diarrhoea, steatorrhoea, abdominal distension, wasted buttocks, hypotonia, growth failure, weight loss, anaemia, anorexia, irritability, malnutrition and associated nutritional deficiencies (fat-soluble vitamins, electrolytes, etc.). Laboratory findings may include iron-deficiency anaemia, low levels of albumin, calcium and increased alkaline phosphates. However, most patients identified with screening tests have few or no symptoms of coeliac disease.<sup>17,18</sup> Some however, manifested with recurrent vomiting or constipation even with rectal prolapse and Intussusception. In contrast, most of the recent studies show that gastrointestinal manifestations are less prominent at diagnosis. Only 36–42% presented with diarrhoea, while 26% were diagnosed upon

targeted screening, and 16% presented with non-specific recurrent abdominal pain.<sup>19,20</sup> Another trend in coeliac disease is the presentation later in life with atypical symptoms such as anaemia, bone disorders or autoimmune diseases.<sup>18</sup> Untreated coeliac disease will lead to short stature, delayed puberty, anaemia, rickets, intestinal lymphoma, psychiatric problems and even miscarriages.

Keeping in mind these changing trends in the clinical presentation, coeliac disease can be recognised earlier if we consider performing the screening and diagnostic tests in patients presenting with failure to thrive, short stature and pallor. After identifying these patients, and by starting gluten-free diet, many serious complications of the disease can be avoided. Objective of this study was to evaluate the frequency and mode of presentation of coeliac disease in children presenting with failure to thrive.

## MATERIAL AND METHODS

This was an OPD based cross-sectional study conducted at paediatrics department, Madina Teaching Hospital in collaboration with Histopathology Department, University Medical and Dental College, Faisalabad, from April 2010 to March 2011. During this time, 60 children, age 4–16 years, who presented with failure to thrive as assessed by their height, weight and percentile charts were enrolled. After taking informed written consent from the parents, they were asked about the associated complaints like chronic diarrhoea (loose motions >14 days), abdominal pain, anorexia, polyphagea, constipation, pallor, and vomiting. Their height and weight were taken and plotted on percentile charts. Patients were evaluated for signs of anaemia, rickets, malnutrition, clubbing and abdominal distension. Investigations like haemoglobin, peripheral blood picture, serum albumin, Calcium, Phosphate, alkaline phosphate and X-rays wrist were performed. Bone age of the patients was assessed radiologically and the jejunal biopsy was done in all patients that was considered as the diagnostic tool. We were able to perform Tissue Transglutaminases in few patients because of financial constrains.

Children who were suffering from primary or secondary malnutrition due to other chronic illnesses were excluded from the study. The data were tabulated and analysed using SPSS-17. Percentages of different variables were calculated. Chi-square test was used and  $p < 0.05$  was considered significant.

## RESULTS

Total 60 children, 33 (55%) male and 27 (45%) female, were included in the study. Their age was 4–16 years, with a mean age of  $8.9 \pm 3.7$  years. The minimum bone age assessed radiologically was 1 year and maximum was 10 years with mean bone age  $4.5 \pm 4.3$  year. Out of

these, 24 (40%) were diagnosed as coeliac disease on the basis of jejunal biopsy. All these patients were having stage 3 of Marsh's classification. Among these 24 patients, there were 14 (60%) boys and 10 (40%) girls. Mean age of coeliac patient was  $8.1 \pm 3.4$  year. The result of jejunal biopsy in remaining 60% of the patients turned out to be non-specific deudentitis (Table-1).

The most frequent symptom among these coeliac patients was abdominal distension (75%,  $p=0.041$ ), followed by pallor (71%,  $p=0.048$ ). Chronic diarrhoea was present in only 12 (50%) patients ( $p=0.16$ ) in our study. Other complaints that were encountered in these patients include anorexia, polyphagia, clubbing, abdominal pain, rickets and muscle wasting (Table-2).

Anaemia (Hb <12 gm/dl) was found in all 24 patients. Minimum Hb reported was 4.3 gm/dl and maximum was 11.1 gm/dl with mean Hb  $6.8 \pm 2.9$  gm/dl. Most of the anaemic patients among diagnosed coeliac cases were suffering from mixed deficiency anaemia (42%), remaining had normocytic normochromic (33%) and microcytic hypochromic anaemia (25%) (Table-3). Hypocalcaemia (S/Ca <8 mg/dl) was found in 7 (30%) patients, alkaline phosphates was raised (>530 IU) in all the coeliac patients having signs of rickets. X-ray findings of rickets (cupping, fraying, flaying and osteopenia) were also present in all coeliac patients having rickets. Hypoalbuminemia (S/albumin <3.5 gm/dl) was found in 13 (54%) patients.

**Table-1: results of jejunal biopsy in patients presenting with failure to thrive (n=60)**

Jejunal biopsy results	No.	%
Consistent with Coeliac disease	24	40
Non specific enteritis	36	60

**Table-2: Frequency of signs and symptoms in patients diagnosed as coeliac disease (n=24)**

Symptoms & signs	Present	Absent	%
Abdominal distension	18	6	75
Pallor	17	7	71
Muscle wasting	13	11	54
Anorexia	13	11	54
Chronic diarrhoea	12	12	50
Polyphagea	10	14	42
Rickets	10	14	42
Clubbing	8	16	25
Abdominal pain	8	16	25
Multivitamin deficiency	5	17	8.4

**Table-3: Type of anaemia in patients with coeliac disease (n=24)**

Peripheral Film	No.	%
Normocytic Normochromic Anaemia	8	33
Microcytic Hypochromic Anemia	6	25
Double Deficiency Anemia	10	42

## DISCUSSION

Our study focused on patients presenting with failure to thrive as judged by their height, weight percentile charts

and radiological determination of bone age. The jejunal biopsy was performed in all 60 patients and 40% of cases turned out to be coeliac disease. According to Marsh criteria, all 24 patients were classified as having stage 3, similar jejunal biopsy result were found in a study done by Aziz S *et al.*<sup>21</sup> Remaining 60% cases turned out to be non specific enteritis that is another area of further research. Gluten-sensitive enteropathy could affect the entire small bowel, but has its main manifestation in the duodenum.<sup>22-24</sup> Although the presence of antibodies and human leukocyte antigen (HLA)-DQ typing can support the diagnosis but small bowel biopsy still remains an essential component of screening and diagnosis of coeliac disease. The prevalence of gluten sensitivity in architecturally normal small bowel is increasing.<sup>25,26</sup> So these patients need further evaluation by serological markers like Tissue Transglutaminases and anti-endomysial antibody. In our study Tissue Transglutaminases antibodies were performed in only 7 patients because of financial constrains.

Abdominal distension was the most common sign in our study. Chronic diarrhoea, that was considered the typical presenting feature of coeliac disease, was not the major complaint in our patients. In a study done by Aziz S *et al.*<sup>21</sup> at Karachi, 69% children presented with prolonged diarrhoea and 53% had abdominal distension. In recent studies the gastrointestinal manifestations are less prominent at diagnosis. Only 36-42% presented with diarrhoea while 26% were diagnosed upon targeted screening and 16% presented with non-specific recurrent abdominal pain.<sup>19,20</sup> Ravikumara *et al.*<sup>19</sup> reported a considerable rise in the number of patients without symptoms picked up by targeted screening. Some studies<sup>27-29</sup> have demonstrated increased incidence of coeliac disease among children presenting with short stature, shown in our study as well.

Van Heel DA *et al.*<sup>18</sup> studied the presentation of coeliac disease later in life with atypical symptoms such as anaemia, bone disorders or autoimmune diseases. In our study, anaemia was present in all patients diagnosed as coeliac disease, type of anaemia being microcytic hypochromic in 25%, mixed deficiency in 41%, and normocytic normochromic anaemia in remaining 34% cases. The results are comparable to a study by Sián J *et al.*<sup>30</sup> where iron deficiency anaemia was the most common presenting complaint in patients of coeliac disease. None of the patients in our study had oedema but hypo-albuminemia was found in 54% of the cases; similar observation was reported by Ayesha H *et al.*<sup>31</sup> in their study.

Keeping in mind these changing trends in the clinical presentation of coeliac disease, many of the patients presenting with failure to thrive, unexplained anaemia, abdominal distension and associated

autoimmune disorders can be identified by jejunal biopsy, and their risk of developing further complications can be avoided.

## CONCLUSION

Coeliac disease is increasingly presenting with atypical presentation like short stature, failure to thrive, unexplained anaemia, rickets, abdominal distension and abdominal pain. An early diagnosis with jejunal biopsy, can reduce complications.

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