

## Prevalence of Celiac Disease in North Indian Children

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Celiac disease (CD) is being increasingly reported from the wheat-eating population of north India. However, the exact prevalence of CD in children is not known as population screening studies are scarce. Our study aimed to determine the prevalence of CD in 400 children, 6 months to 12 years of age attending pediatrics department of a tertiary care hospital in north India. The study population was screened for anti-tissue transglutaminase (tTG) antibodies. Endoscopic duodenal biopsy was done in the anti-tTG positive subjects. Four patients were diagnosed with CD as per the modified ESPGHAN criteria. The prevalence of CD thus was 1%, which was in concordance with screening studies using serological markers conducted in the West.

**Keywords:** Celiac disease, India, Prevalence, Tissue transglutaminase.

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Celiac disease (CD) is intolerance to gluten present in cereals like wheat. Experts are now in favor of mass screening for CD in populations with high prevalence because, it is a common disorder with significant morbidity, early clinical diagnosis is difficult and it can manifest later with severe complications (*e.g.* infertility, osteoporosis), an effective treatment (gluten free diet) is available and last but not the least, sensitive and simple screening tests are available, *e.g.*, the anti-tissue transglutaminase test (tTG)(1).

CD is being increasingly reported from India and is a major cause of chronic diarrhea in children, especially in northern India(2). The prevalence of CD in Indian children is not well documented, with most of the studies focusing on high-risk groups (*e.g.*, chronic diarrhea, short stature) and not the general population. One study in school children in Punjab reported a prevalence of 1 in 310, although the authors concluded it to be an underassessment(3).

### METHODS

Between January to December 2004, 400 consecutive children between 6 months and 12 years, attending the pediatrics department (either outpatient or inpatient) of our tertiary care teaching hospital in north India, and undergoing venesection for any reason were screened. The subjects underwent detailed history-taking and examination regarding their current and any past illness, blood sampling for investigations relevant for their presenting illness and anti-tTG detection. Anti-tTG (IgA) was estimated by AIDA tTG-A assay by ELISA. The cut-off for a positive tTG test was 15U/mL as per the manufacturer's guidelines. Children with positive anti-tTG test underwent endoscopic duodenal biopsy. The biopsy specimens were evaluated as per the modified Marsh's classification(4). Biopsy positive subjects were started on gluten free diet and followed up for clinical response. CD was diagnosed as per the modified ESPGHAN criteria(1).

### WHAT THIS STUDY ADDS?

- The prevalence of celiac disease in the general pediatric population attending a tertiary care hospital of North India is 1%.

Informed consent from parents and approval of institutional ethical committee were obtained.

### RESULTS

We enrolled 400 children between 6 months and 12 years of age [mean age (SD), 5.6 (3.59) years]. Of these, 43% were females, and 12.5% and 10.5% were wasted and stunted, respectively. By WHO standards, 16% were anemic(5). 5 subjects tested positive for anti-tTG antibodies with serum levels ranging from 25 to 250 U/ml (median, 175U/mL). Of these, two had symptoms of malabsorption syndrome and one subject each, recurrent abdominal pain and chronic diarrhea. On duodenal biopsy, all 4 showed histologic features consistent with Marsh grade 3b. These 4 cases improved significantly on gluten free diet and hence were confirmed to have CD. The percent prevalence of celiac disease from the above data was 1% (95% confidence interval, 0.7% – 1.3%). The fifth subject, an 8 years old female, had chronic diarrhea and wasting and the biopsy showed duodenitis without any villous abnormality. Since this did not fulfill the modified ESPGHAN criteria, she was not included in the list of positive cases.

### DISCUSSION

Most studies in the last two decades have focused on classical CD in which diarrhea is the predominant symptom. Atypical CD with manifestations other than chronic diarrhea remains underdiagnosed with consequent longer exposure to gluten and increase in complications(6). With the advent of simple and accurate serological markers, population screening has shown a higher prevalence (1:70 to 1:250) of CD (1), with a 1:7 ratio of diagnosed to undiagnosed cases(7). The earlier serological markers, namely, anti-gliadin and anti-reticulin antibodies lacked sensitivity and specificity. Anti-endomysial antibodies, though highly sensitive and specific, is complicated and time-consuming. The human anti-tTG

assay is quick, inexpensive, has high sensitivity and specificity, and is suitable for population screening for CD(1).

The prevalence of celiac disease in India is not well documented. In various Indian studies, the prevalence of CD in children with malabsorption ranged from 10% to 26%(2,8). CD accounts for 16% to 40% of children with chronic diarrhea(9-11). In children with short stature, the prevalence of CD is 15%(11). The only Indian study on population screening in children for CD gives a prevalence of 1 in 310(3). The authors concluded it to be an underassessment because serum IgA level was not estimated to rule out isolated IgA deficiency, 4 patients with positive serology refused endoscopic biopsy and finally, 3 patients with positive serology had normal small bowel biopsies and were not diagnosed as CD since they did not fulfill the criteria(3).

An Italian(7) and a Finnish(12) study of mass screening with anti-tTG assay in pediatric population have estimated the prevalence of CD to be 1.06% and 1%, respectively. In the Finnish study(12), serum samples were collected from 3564 students (aged 7 to 16 years) over a 7-year period and screened for anti-tTG and anti-endomysial antibodies. The Italian study(7) screened 3665 school children for CD over 9 months using anti-tTG and anti-endomysial antibodies. In both studies, all antibody positive subjects underwent small bowel biopsy. There was good correlation between the two autoantibody positivities. Hence the results of these two studies and that of our study are concordant.

Since this was a hospital based study, it may not be a true representation of the general population. However, based on the results obtained, a larger study can be conducted in the general community, with a larger sample size. Also, since serum IgA levels were not estimated, the study could have missed true cases of CD with isolated IgA deficiency.

It is concluded that CD is a significant pediatric health problem in north Indian children and screening programs in apparently healthy population is a worthwhile proposition.

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*Contributors:* MB collected the data, did initial analysis and wrote the paper. APD conceptualized the idea, edited and approved the final version. He will act as guarantor. NBM contributed towards literature search and preparation of the manuscript.

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