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ORIGINAL ARTICLE

Short Stature as a Major Manifestation of Celiac Disease in Children 1-14 years of age at Shaikh Zayed Hospital Lahore

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ABSTRACT

Aim: To find the frequency of asymptomatic celiac disease in children with proportionately short stature.
Methodology: This prospective study was carried out at the Department of Paediatrics, Shaikh Zayed Hospital, Lahore. A total of 151 cases of proportionate short stature were selected according to selection criteria and informed consent. Their history, examination, and detailed demographics were recorded. They were tested for anti-Tissue Transglutaminase2 IgA antibody levels, and the results were interpreted.
Results: Fifty (33.1%) were males and 101(66.9%) were females, with a mean age of 7.7±3.3 and a mean height of 106.9±17.0. Anti-TG2 IgA levels were positive in 15 (9.9%) patients and negative in 136(90.1%) patients. The frequency of asymptomatic celiac disease among proportionately short statures is 9.9%.
Conclusion: The frequency of 9.9% cases of asymptomatic CD among children with pathologically proportionately short stature.
Keywords: Extra-intestinal manifestations, Asymptomatic celiac disease, Short stature, Children

INTRODUCTION

Celiac disease (CD) is a systemic autoimmune disorder of inability to tolerate gluten containing diet in genetically prone individuals. It is more prevalent in females and children as compared to males and adults, respectively. The incidence is 21.3 per 100,000 person-years in children. This trend has increased annually by 7.5% over the past few decades[1]. In the 21st century, the rising trend in disease is due to availability of better diagnostics and increased awareness of the disease in local practitioners.

Celiac disease generally presents as chronic diarrhea, failure to thrive and growth retardation in children during first two years of life[2] However, after two years, CD mostly presents with extraintestinal manifestations. The extraintestinal symptoms include iron deficiency anemia, short stature, delayed puberty, arthritis, epilepsy, peripheral neuropathies, dental enamel hypoplasia, dermatitis herpetiformis etc.[3,4] This late onset atypical celiac disease is diagnosed by serologic screening.

Short stature is one of the major extraintestinal manifestations of celiac disease.[4]It is defined as standing height less than third centile for the age and gender correlated with mid parental height. The prevalence of short stature in Pakistani children is 16.5%.[6]As childhood is the most important period of longitudinal growth, any insult/disease during this period brings lifetime consequences and social embarrassment. CD is a pathological cause of short stature. A study conducted in Italy revealed the incidence of CD to be 8.3% in a group of children with short stature[5]. One regional metanalysis published in 2021 included seventeen studies having 3759 patients and concluded that 11.2% of children with all-cause-short stature and 9.7% with idiopathic short stature had CD[7]. A study conducted in Saudi Arabia showed the incidence of Confirmed CD as 10.9% and Potential CD as 4.3% in children with short stature[8]. A recent study done in Peshawar showed the prevalence of celiac disease to be 33% in children with short stature[9].

As maximum growth takes place in childhood, any treatable disease during this period should be immediately recognized and treated[10]. Short stature is a major concern and causes a lot of anxiety for the parents. Increasing trend in the extra intestinal manifestation of CD during the last decade demands timely recognition of the disease and initiation of treatment to avoid morbidity and mortality. The objective of this study is to find the frequency of asymptomatic celiac disease in children with short stature so that every physician considers this treatable cause.

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MATERIALS AND METHODS

This prospective study was carried out in the Department of Pediatrics, Shaikh Zayed Hospital, Lahore after approval from Institutional Review Board (IRB number: SZMC/IRB/Internal/ 380/2021). All children between 1-14 years of age who fulfilled the selection criteria were recruited from Pediatric OPD through nonprobability consecutive sampling. Informed consent was taken from the guardian. We calculated the sample size of 151 cases using 95% confidence level, 5% margin of error with expected frequency of asymptomatic celiac disease among children with short stature as 11.2%[7].

All children of ages between 1-14 years with pathological proportionate short stature were studied. Short stature was defined as standing height (in children above 2 years of age) or head to heel length (in children below 2 years of age) below third centile appropriate for the age and gender plotted on WHO or CDC growth charts.[11] Proportionate short stature was defined as upper segment to lower segment ratio 1.7:1 at birth, 1:1 at 10 years or <1.3:1 at above 10 years of age. Detailed history was taken; physical examination and appropriate tailored investigations done to rule out other causes of short stature. The findings were recorded. We excluded patients with any cause of disproportionate short stature, familial short stature according to mid-parental height, constitutional short stature, hypothyroidism, growth hormone deficiency, h/o preterm birth, any chronic disease, syndromic children, h/o recurrent infections, diagnosed cases of celiac disease, children with typical intestinal manifestations of celiac disease like diarrhea, abdominal pain and distension. Then a 2cc blood sample was withdrawn and sent to the laboratory for anti-tissue transglutaminase 2 IgA antibody (anti-TG2 IgA ab) testing. The test results were recorded as positive or negative in the proforma. Those with positive test results were labelled as asymptomatic celiac disease as per operational definition (Asymptomatic CD is defined when patients have positive serology).

All the data was processed in SPSS-20. Numerical variables like age and height were presented as Mean±SD. Categorical variables like gender, positive or negative anti-TG2 IgA levels were recorded as frequency or percentage. Data was stratified for gender, age and frequency of celiac disease was reported for each group. Post-stratification chi-square test was applied. P value ≤0.05 was considered significant.

Asymptomatic Celiac Disease (CD) is prevalent in children with short stature, with gender and age playing significant roles. Testing all children with short stature is justified.

RESULTS

Fifty (33.1%) were male and 101 (66.9%) were female. The mean age was 7.7±3.3 and mean height 106.9±17.0. Anti-TG2 IgA levels were positive in 15(9.9%) patients and negative in 136 (90.1%) patients (Table 1). So, the frequency of asymptomatic celiac disease among pathologically proportionate short stature is 9.9% which is not ignorable and must be considered. Stratification of data according to age shows no significant difference in the frequency of asymptomatic celiac disease among children less than 7 years of age and greater than seven years of age with P value was 0.341 (Fig. 1). But the frequency of asymptomatic celiac disease is close to significant value in females as compared to males (Table 2).

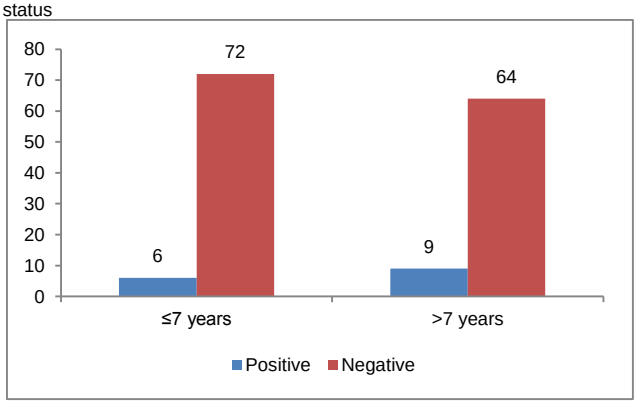
Table 1: Distribution according to Age, Gender and Anti-TG2 IgA status (n=151)

Variable	No. (%)
Age	7.7±3.3
Height	106.9±17.0
Gender	
Male	50 (33.1%)
Female	101 (66.9%)
Anti-TG2 IgA	
Positive	15 (9.9%)
Negative	136 (90.1%)

Table 2: Stratification of data according to gender (n=151)

Variable	Male	Female	P-value
Age (years)	8.0±3.7	7.6±3.1	0.539
Height (cm)	109.8±18.6	105.7±16.1	0.244
Anti-TG2 IgA			
Positive	2 (4%)	13 (12.9%)	0.086
Negative	48(96%)	88 (87.1%)	

Fig. 1: Stratification of data according to age of asymptomatic celiac disease status



DISCUSSION

Celiac disease (CD) has emerged in last year's with its extra-intestinal manifestations.[12] The prevalence of celiac disease in Asia is higher among women than men[13]. One of the major extraintestinal manifestations of celiac disease is short stature as solo presentation without accompaniments of other symptoms. With this aim we conducted research to find out the prevalence of pathological short stature as solo manifestation in children having asymptomatic celiac disease

In the present study, 50 (33.1%) were male and 101(66.9%) were female with mean age of 7.7±3.3 years. Diagnosis of celiac disease was done based on positive serology only after excluding other causes of pathological short stature. Fifteen (9.9%) were positive for serum anti tissue transglutaminase 2 IgA antibody levels (anti-tTG2 IgA) confirming the diagnosis of celiac disease among asymptomatic CD while the rest 136 (90.1%) were negative. We measured only anti-TG2 IgA levels for diagnosis of celiac disease. Ideally total IgA levels should have been done but this investigation could not be done due to the non-affordability of patients. Yet suspicion of IgA deficiency was ruled out by excluding all those cases with history of recurrent infections. Our study showed 9.9% frequency of asymptomatic CD among pathologically proportionate short stature.

The mean age of the children is 7.7±3.3 years in our study which is comparable with other local and regional studies[9,14,15]. Data stratification according to gender has shown female preponderance in our study: there was significant relationship between asymptomatic CD and female gender (P value= 0.08). Results of other studies show similar trends endorsing our findings. Preponderance of female gender was reported in one study from Faisalabad.[14] When data was stratified according to age, there was no significant correlation of celiac disease between age group less than seven years and above seven years. It was equally common among all age groups.

Our study showed 9.9% frequency of short stature in asymptomatic CD. An Indian study found 11% frequency of short stature which is quite close to our own study.[16] A study conducted in Saudi Arabia showed incidence of Confirmed CD and Potential CD as 10.9% and 4.3% respectively which is different from our findings[18]. Two local studies have shown higher frequency of short stature, one study from Peshawar which reported frequency of 33.7% and another study from Faisalabad with frequency of 40%[9,14]. This much higher frequency has been reported from Iran also[17]. The reasons could be due to differences in the sample size, study design, diagnostic test, and genetic factors.

Limitation of study: This study was the first of its kind conducted in a tertiary care center in Lahore. Only serologic markers were used to screen for celiac disease. But biopsy of small intestine, which is a prerequisite for final diagnosis was not done. Also, serum IgA levels were not done due to non-affordability of patients. Future studies are recommended with more accurate testing to report the results in other tertiary care centers of the country.

CONCLUSION

Asymptomatic Celiac Disease (CD) is prevalent in children with short stature, with gender and age playing significant roles. Testing all children with short stature is justified.

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1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

All authors agree to be responsible for all aspects of their research work.

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