

A Prospective Study to Assess the Compliance of Gluten Free Diet In Children of Celiac Disease through Clinical Profile and Anthropometric Measurements

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ABSTRACT

Background: Celiac disease (CD) is an immune-mediated enteropathy, induced by gluten in genetically susceptible individuals. Monitoring of adherence is best done through regular visits to a dietician as an expert dietary history is the best known noninvasive indicator of intestinal damage. This study assumes that the caregivers of the participants were accurate and honest in their responses to the survey with potential of providing skewed results.

Materials & Methods: This is a prospective study was done on 56 cases in Government Bangur Hospital, Pali, Rajasthan. Children below 6 months of age or children, exclusively breast fed, which was excluded in our study. Anthropometry of every child was recorded at presentation, then at 1 month, 3 month and 6 month follow up. It includes weight, height, head circumference (1- 5 years), mid arm circumference (1 – 5 years).

Results: Our study showed that the male to female ratio was 1:1. Majority of gender seen in schooler (5-12 yrs) age groups. The majority of subjects (37 cases) complained failure to gain weight followed by 30 cases had abdominal distention at present when patients come in hospital. BMI have 15-20 kg/m² was significantly increases ($P < 0.0001^{***}$) initially from 13

cases to 38 cases in after 6 months. The 89.28% cases have good compliance followed by 7.14% had doubtful cases and only 3.57% cases had poor compliance.

Conclusion: In conclusion, the GFD promotes to a normalization of body bulk (evaluated as weight-for-height) and a considerably improvement in height-for-age in developing countries such as India where children have minimal retrieve to nutritionally suitable alternatives to wheat.

Keywords: Celiac Disease, Gluten Free Diet, BMI, Compliance.

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INTRODUCTION

Celiac disease (CD) is a chronic, immune-mediated process, caused by the ingestion of gluten (wheat, barley, rye and derivatives) in genetically predisposed persons (HLA DQ2 DQ8). It is a permanent gluten intolerance, related to an abnormal immune response against the two main gluten proteins: glutenin and gliadin.¹ In North India, CD is the most common cause of chronic diarrhea in children aged 2 years and above.²

Adherence to gluten free diet is very important as it is the only treatment of celiac disease available right now. Also, non-compliance exposes the patients to many long term risks and complications like malnutrition, failure to thrive, wasting, stunting and later on spontaneous abortions, low birth weight in offspring, osteoporosis and CD related cancer like Non Hodgkins lymphoma. Monitoring of adherence is best done through regular visits to a dietician as an expert dietary history is the best known noninvasive indicator of intestinal damage.³ However in a country like India, caregivers of the participants may have a lack

of knowledge related to their dietary intake and probability of recall bias is high. Since institution of a GFD in patients of CD results in normalization of weight and height, these variables can also be used to monitor compliance of a GFD.⁴ In spite of many reports of Celiac disease in India, few studies have demonstrated the follow up profile of these children on a gluten free diet. The present study details the clinical and nutritional profile of children with Celiac disease at the time of diagnosis and their follow up after they are put on a GFD. This study assumes that the caregivers of the participants were accurate and honest in their responses to the survey with potential of providing skewed results.

MATERIALS & METHODS

This is a prospective study was done on 56 cases in Government Bangur Hospital, Pali, Rajasthan. Children below 6 months of age or children, exclusively breast fed, which was excluded in our study.

Anthropometry of every child was recorded at presentation, then at 1 month, 3 month and 6 month follow up. It includes weight, height, head circumference (1- 5 years), mid arm circumference (1 – 5 years). Patients were explained the importance of a gluten free diet as the only treatment available, the risks of complications due to non-adherence of GFD were also explained and a gluten free diet chart was handed over to them.

An assessment of the compliance of GFD was done on the basis of history:

Good compliance: The parent/caretaker were sure of giving a gluten free diet also sure that the child was not taking any food containing gluten at home, school or any other place.

Doubtful compliance: The parent/caretaker were sure of giving a gluten free diet on most days but were not aware if the child had food containing gluten in school.

Poor compliance: The parent/ caretaker gave gluten free diet for some time after which they either stopped giving the child gluten free food or never gave the child a diet free of gluten.

Table 1: Gender wise distribution of patients in various age groups (N=56)

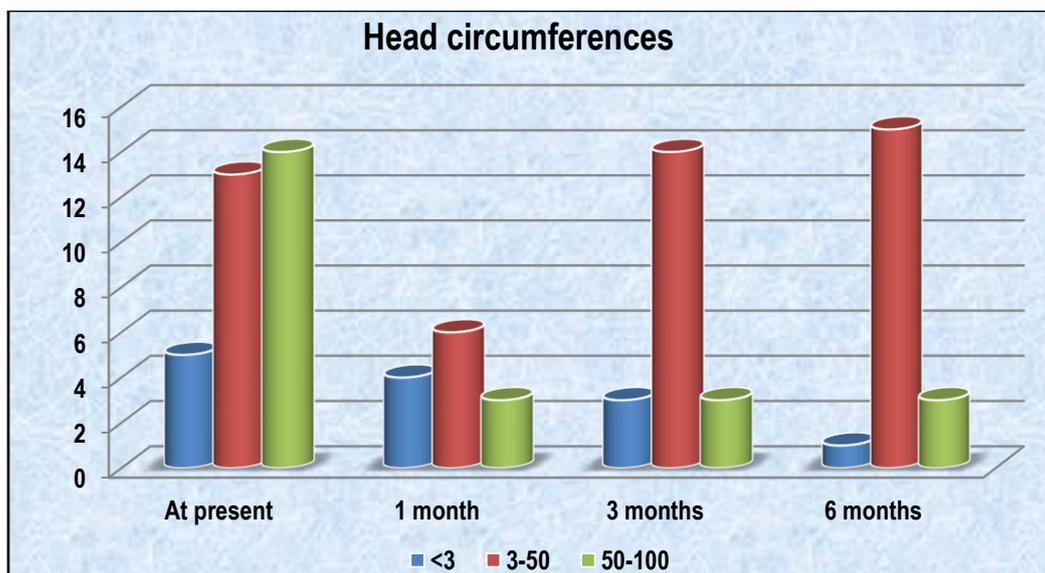
Age groups	Male	Female	Percentage
Toddler (1-3 yrs)	8 (28.57%)	5 (17.85%)	13 (23.21%)
Pre-school (3-5 yrs)	7 (25%)	4 (14.28%)	11 (19.64%)
Schooler (5-12 yrs)	10 (35.71%)	11 (39.28%)	21 (37.5%)
Teenager (12-18 yrs)	3 (10.71)	8 (28.57%)	11 (19.64%)
Total	28 (50%)	28 (50%)	56 (100%)
Chi-square test= 3.831			P=0.280

Table 2: Symptoms of patients in various interval

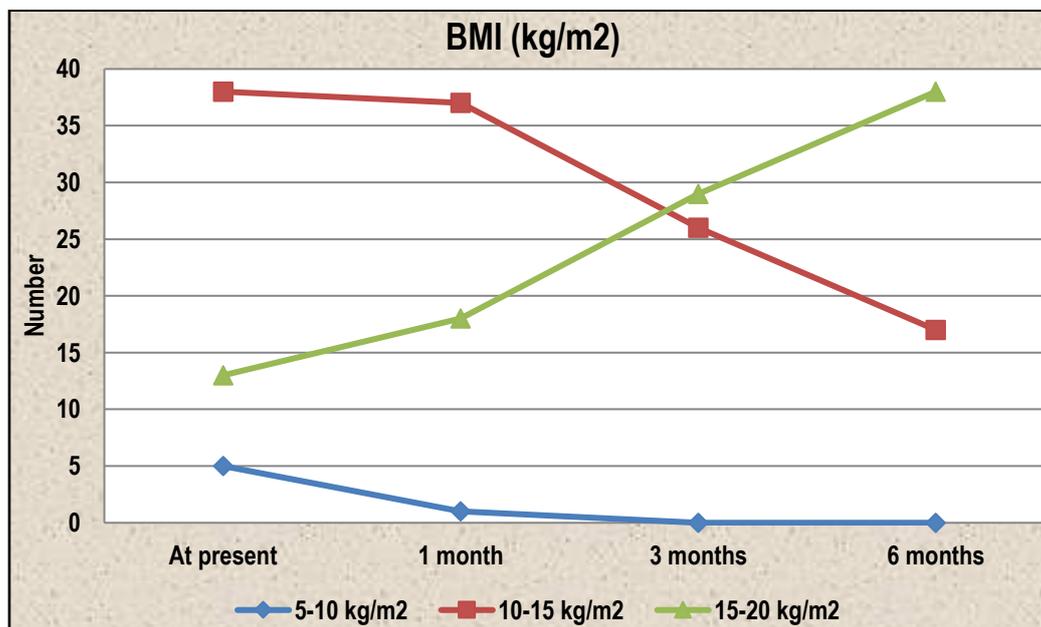
Symptoms	At presentation	1 month	3 months	6 months
	No. of subjects	No. of subjects	No. of subjects	No. of subjects
Loose stool	19	8	7	6
Failure to gain weight	37	2	1	1
Pain abdomen	22	13	1	1
Vomiting	13	2	0	0
Abdominal distention	30	16	6	2
Constipation	15	5	3	1
Irritability	20	11	3	1
Behavioral change	3	2	0	0
Skin lesions	4	4	0	0
Mouth ulceration	3	2	0	0
Celiac crisis	1	1	0	0
Recurrent infection	2	0	0	0

Table 3: Mid arm circumferences of patients in various interval (N=21)

Mid arm circumferences(centile)	At present	1 month	3 months	6 months
	No. of subjects	No. of subjects	No. of subjects	No. of subjects
<12.5	9	6	1	1
12.5-13.5	6	4	6	1
>13.5	6	10	13	18
Chi-square test= 21.28			P=0.0016**	



Graph 1: Head circumferences of patients in various interval



Graph 2: BMI of patients in various interval

Table 4: Compliance (N=56)

Compliance	Number	Percentage
Good	50	89.28%
Doubtful	4	7.14%
Poor	2	3.57%
Total	56	100%

RESULTS

Our study showed that the male to female ratio was 1:1. Majority of gender seen in schooler (5-12 yrs) age groups (table 1). The majority of subjects (37 cases) complained failure to gain weight followed by 30 cases had abdominal distention at present when patients come in hospital. After 1 month mostly patients had abdominal distention (16 cases), followed by pain abdomen (13 cases). After 3 months only 6 patients had abdominal distention and after 6 months only 2 patients had abdominal distention but 6 cases had loose stool (table 2).

The majority of cases (13 cases) seen in 3-50 centile of head circumferences, followed by 5 cases have <3 centile and 4 cases had 50-100 centile of head circumferences at present, So head circumferences were not significant (P=0.5246) in various interval (graph 1). The mid arm circumferences of patients in various interval was statistical significant (P=0.0016**) (table 3). BMI have 15-20 kg/m² was significantly increases (P<0.0001***) initially from 13 cases to 38 cases in after 6 months (graph 2).

The 89.28% cases have good compliance followed by 7.14% had doubtful cases and only 3.57% cases had poor compliance in our study (table 4).

DISCUSSION

In our results suggested that the majority of cases (37.5%) were seen in the age group of 5-12 years and minimum cases (19.64% cases each) were seen in the age group 3-5 years and 12-18 years, overall male to female ratio was 1:1. Similar our results with Jadresin et al⁵ mean age was 12 years.

Our study observed that the majority of subjects (37 cases) complained failure to gain weight followed by 30 cases had abdominal distention at present when patients come in hospital.

Vecsei E⁶ found that 15.1% had abdominal pain, and 1.9% each had constipation and aphthous stomatitis, 79.2% were symptom free after 1 year of GFD. After initiation of GFD weight for height normalized at the end of first year and over shot during the second year indicating that weight catches up more quickly than height leading to a transitory status of overweight. Increase of weight was statistically significant p <0.0001 in our study. A study published in 2016 in Turkey, at first year of GFD, height for age and weight for age z scores significantly increased compared with baseline.⁷ Significant differences in these parameters were not detected between strictly compliant and non-compliant patients on GFD. Patwari AK et al⁸ stated that height for age shows a significant increase at each year of completion of GFD, a linear catch up growth in terms of height in initial follow up. Brambilla P et al¹⁸ observed that the weight and BMI of CD patients were significantly lower, this is may be due to the absolute reduction in number of underweight children during GFD probably is attributed to a physiological catch up growth. Our study showed that head circumferences were not significant (P=0.5246) in various interval. Mid arm circumferences increases of no. of cases (total 18) after 6 months in >13.5 centile but <12.5 & 12.5 to 13.5 centile the decreases of no. of cases (From 9 to 1 & 6 to 1 respectively) from initially to after 6 months periods, which is similar with Patwari AK et al.⁸ The present study showed that 89.28% cases had good compliance and only 3.57% cases had poor compliance after treatment with gluten free diet in celiac patients. A study carried out in India in 2010 to assess the dietary compliance of GFD on 6 month follow up through a self-administered questionnaire, found that 75% patients were compliant and 18% were non-compliant. Compliance was higher in younger children > 80% compared to adolescents 44%.⁹

CONCLUSION

In conclusion, the GFD promotes to a normalization of body bulk (evaluated as weight-for-height) and a considerably improvement in height-for-age in developing countries such as India where children have minimal retrieve to nutritionally suitable alternatives to wheat. Apart from the GFD, careful follow up and good compliance with the dietary rules are mandatory for enhance children's growth potential.

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