

Growth Status of Bangladeshi Children in Functional Constipation: Experience From A Tertiary Care Hospital

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ABSTRACT:

Background: Constipation is one of the common complaints of children with long-term hazardous consequences. It is a frequent cause of hospital visit in both primary and specialized care which needs proper evaluation and management. Recently in few studies, impairment of growth status has been reported as a result of functional constipation. But the relation is not well evaluated, especially in the pediatric population of our country.

Aim: To assess the growth status of Bangladeshi children in functional constipation.

Methods: This analytical study was conducted at the department of Pediatric Gastroenterology and Nutrition, BSMMU, Dhaka. A total 150 children aged 2-18 years were enrolled in this study. Children were divided into two groups, 75 having functional constipation (FC) and 75 healthy children with no constipation. Samples were collected randomly from pediatric out-patient department of BSMMU with consent of parents and child's approval. Diagnosis of functional constipation was made by Rome IV criteria. Children with any red flag sign, chronic disease and on treatment of constipation were excluded from the study. Growth status (weight, height & BMI) was evaluated by using growth charts. Data collected in semi-structured questionnaire and analyzed by SPSS 23.0.

Results: We evaluated 75 constipated children with the mean age of 7.61 ± 3.50 years and 75 healthy children with the mean age of 7.40 ± 3.88 years. The mean weight of children with functional constipation was 22.8 ± 10.01 kg, mean height 117.7 ± 18.4 cm and BMI 15.6 ± 2.3 kg/m². The mean weight of children with no constipation was 28.6 ± 13.72 kg, mean height 124.49 ± 23.3 cm and BMI 18.11 ± 2.9 kg/m², demonstrated significant difference between two sets. In functional constipation group, on weight for age and height for age chart, 28% and 24% children were below the 3rd centile respectively and 18.6% children had BMI below 5th centile. All these parameters (weight, height, BMI) were statistically significant in compare to children without constipation and p value is $<.05$. Presenting features of functional constipation were anorexia (64%), abdominal pain (73.3%), hard stool (84%), blood mixed hard stool (13.3%) and nausea (34%).

Conclusion: Growth impairment occurs in children with functional constipation in comparison to children without constipation. Children aged 2 to 18 years with functional constipation may have decelerated weight, height and BMI growth. And this observation needs further large-scale multicenter study for ensuring optimal growth of children with constipation.

Key Words:

Children, Functional constipation (FC), Growth status, Growth chart.

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Introduction

Constipation is a common pediatric problem which is frequently overlooked. 17% to 40% children experience their first episode of constipation during infancy¹. This disorder is accompanied with painful bowel movement, abdominal pain and sometimes fecal incontinence². It affects the child and family's quality of life by making them uncomfortable². Constipation is generally defined as infrequent stool, passage of hard stool or both³. North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) defines constipation as delay or difficulty in defecation, present for 2 or more weeks and sufficient to cause significant distress to the patient⁴. Regarding etiology of constipation, 95% functional and 5% are organic⁵. Among organic causes, Hirschsprung disease is the most common⁶.

Constipation may be acute or chronic. Acute constipation is due to changes in diet, place, drugs, anal fissure, perianal inflammation etc. Chronic constipation is functional in more than 90% cases⁶. As functional constipation is the most frequent one, it should be taken into consideration when organic diseases are excluded^{7,8}.

Functional constipation is diagnosed by Rome IV criteria. For children ≥ 4 years, at least two features of ROME IV criteria must be present with duration of minimum one month: 1) Two or fewer defecations in the toilet per week. 2) At least one episode of fecal incontinence per week. 3) History of retentive posturing or excessive volitional stool retention. 4) History of painful or hard bowel movements. 5) Presence of a large fecal mass in the rectum. 6) History of large-diameter stools that may obstruct the toilet. These symptoms cannot be fully explained by another medical condition and symptoms are insufficient to fulfill the diagnostic criteria of irritable bowel syndrome.

Among general population and even in physicians, common belief is FC has no remarkable impact on child's growth. Recently in few studies impairment of growth status has been reported as a consequence of functional constipation. Several studies showed significant negative impacts of constipation on the children's weight and height. Adequate treatment of constipation and elimination of risk factor improve constipated children's growth⁹. But the relation is not well evaluated in the pediatric population of Bangladesh.

Objective

To assess the effect of functional constipation on physical growth of children and compare this growth status with children having no constipation.

Methodology

It was a cross sectional analytical study, conducted at the department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU) from January 2021 to June 2022 (18 months). A total of 150 children aged 2 to 18 years, 75 with FC and 75 having no constipation were enrolled in this study. Children were assembled from outdoor visit. Proper history, clinical examination, relevant investigation, Rome IV criteria were done and samples were selected accordingly. Children having constipation but did not fulfill Rome IV criteria, having organic or chronic disease and already on treatment for constipation were excluded from the study. Details clinical history, examination findings and investigation reports were recorded in a predesigned structured data sheet. Height, weight and Body Mass Index (BMI) were recorded. Weight of every child was measured by same bath room scale, preferably at early morning with minimum clothing after evacuation of bowel and bladder. Height measurement done by stadiometer. BMI was calculated by using formula of weight in kg divided by height in meter square. CDC recommended percentile growth chart were used to determine age-specific growth of children.

Operational Definition

Diagnosis of functional constipation was made by Rome IV criteria. Presence of chronic disease or any red flag sign were considered as organic cause. Weight for age less than 3rd centile termed as underweight & Height for age less than 3rd centile stunted. BMI more than 85th centile overweight, between 5th to 85th percentiles normal weight and less than 5th centile was considered as underweight.

Results

A total 150 participants between 2-18 years were taken as study sample and divided into two groups, one group of children with functional constipation (FC) and another group without constipation.

Table-1: Weight for age on centile chart of growth, one group with FC and another without constipation (N=150)

Weight for age centile	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<3 rd centile	21(28)	2(2.8)	<0.001
3 rd -97 th centile	53(70.6)	70 (93.3)	
97 th centile	01 (1.4)	3 (4.0)	

p value was determined by chi-square test. Results were expressed as percentage

Table 4.1 analyze weight for age in children with FC and without constipation. Among children with FC, 28% had weight <3rd centile and 70% had weight between 3rd-97thcentile and 1.4% had weight over 97thcentile. On the other hand, 93.3% children without constipation had weight between 3rd-97thcentile. Weight for age < 3rd centile was found higher in children with FC group and p value was significant (p<.05).

Table 4.2: Height for age on centile chart of growth, one group with FC and another without constipation (N=150)

Height for age centile	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<3 rd centile	18(24)	0	<0.001
3 rd -97 th centile	53(73.3)	71 (94.66)	
97 th centile	2 (2.6)	4 (5.34)	

p value was determined by chi-square test

In Table 4.2 24% children with FC had height <3rd centile and 73.3% children had height between 3rd-97th centile. In healthy children group, 94.4% children had normal height between 3rd-97th. Height for age < 3rd centile was statistically significant in children with FC group (p<.05).

Table 4.3: BMI for age with FC group and without constipation (N=150)

BMI for age	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<5 th centile	14(18.6.)	0	<0.001
5 th -85 th centile	56(74.6)	55(73.3)	
85 th - 95 th centile	04 (5.3)	13(17.3)	
>95 th centile	01(1.3)	07(9.3)	

p value was determined by chi-square test. Results were expressed as percentage

Table 4.3 showing analysis of body mass index (BMI) of the studied population.18.6% children with FC had BMI <5th centile according to age and p value was statistically significant (p<.05)

Table 4.4: Mean of Anthropometric variables of children with functional constipation and without constipation (N=150)

Variables	With FC n=75	Without FC n=75	p value
Weight in kg (Mean± SD)	22.8±10.01	28.6± 13.72	<.05
Height in cm (Mean± SD)	117.7 ±18.4	124.49±23.3	<.05
BMI in kg/m2 (Mean± SD)	15.6±2.3	18.11±2.9	<.001

p value was determined by unpaired t test and p value <0.05 is considered significant. Results were expressed as mean.

Table 4.4 showing analysis of mean of anthropometric variables (weight, height and BMI) of studied population. Mean weight, mean height and BMI in children with FC group were less in comparison to healthy children group and p value were statistically significant.

Table 4.5: Symptom analysis of children with functional constipation and without constipation

Variables	Functional Constipation n=75 n (%)	Without FC n=75 n (%)	p value
Anorexia	48 (64.0)	6 (21.6)	<.001
Nausea	26 (34.6)	3(8)	<.001
Abdominal Pain	55 (73.3)	12(21.3)	<.001
Hard stool	63 (84)	4(5.6%)	<.001
Blood with hard stool	10 (13.3)	0(0.0)	<.05
Abdominal distension	15(20)	7 (1.2%)	.064
Fecal mass in LIF	04 (5.4)	0 (0%)	0.12

* p value was determined by Chi-square test, P-value <0.05 considered significant.

Results were expressed as percentage

Table 4.5 showing Children with functional constipation had higher frequency of anorexia, nausea, abdominal pain, hard stool, blood with hard stool than children without constipation and these parameters were statistically significant (P-value <0.05).

Discussion

Physical and psychological effect of constipation on children is an inevitable fact. Various evidence showed the susceptible effects of functional constipation on the development of children, especially in the early years of life.

Our study revealed children with FC had less weight and height than healthy children. Constipated children were found wasted and stunted in comparison to healthy children and p value was significant. BMI for age also found low in functional constipation group. Chao et al. demonstrated that chronic constipation may retard growth and a long-term medication for constipation appears beneficial to their growth status⁹. Yousefi A et al. observed mean weight and height were lower in children with constipation and difference of weight-for-age Z score (WAZ) and height-for-age Z score (HAZ) were

statistically significant between constipated and healthy children¹⁰.

In contrast, some research papers showed a high prevalence of obesity in children with functional constipation. In a study by Ilan et al. revealed most children with constipation were obese or overweight. Dehghani et al conducted a study on 100 Iranian children with functional constipation (younger than 18 years) and found higher obesity and higher BMI in constipated children¹¹. But we had no such finding regarding overweight and obesity. Benzamin et al. observed children with functional constipation have impaired growth¹² (weight for age and BMI). They reported - poor intake of food due to anorexia, nausea and abdominal pain may play contributory role in growth retardation¹². Pawlowska et al. demonstrated children with FC were slightly shorter for age and sex compared with the reference population. They observed high prevalence of short stature (almost 11%) with FC¹³. This study result of growth impairment are consistent with our study outcome.

Conclusion

In this study we found nearly one third children with functional constipation had weight, height and body mass index below 3rdcentile. Our remark - growth impairment occurs in children with functional constipation in comparison to children without constipation. So early diagnosis and treatment of functional constipation will be beneficial in achieving adequate growth.

Limitations of The Study

Times and resources were limited. Sample size was also small and this study was carried out in a specific center of Dhaka city which is not the true representation of all Bangladeshi children who have functional constipation.

Recommendation

Larger sample size and multicenter study.

Conflict of Interest

The authors declare no conflict of interest.

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