

ORIGINAL RESEARCH

To find out the bowel function, dietary habits and their association with physical and behavioral problems in children suffering from functional constipation

Dr Richa Rathore¹, Dr Dinesh Mekle², Dr Abdul Hafeez³

Dr Jagdamba Dixit², Dr Arpit Goyal³

Assistant Professor¹ Professor² Post Graduate Redresident³ Departement Pediatrics, People's College Of Medical Sciences And Research Centre , Bhopal, MP

Corresponding Author

Dr Abdul Hafeez,

Post Graduate Redresident' Departement Pediatrics, People's College Of Medical Sciences And Research Centre, Bhopal, MP

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.ABSTRACT

Background:Constipation is defined as FC if there is no underlying organic cause, what is the case in up to 95% of children. The present study was conducted to find out the bowel function, dietary habits and their association with physical and behavioral problems in children suffering from functional constipation.

Material & methods:The present cross Sectional, descriptive study was conducted among 290 Children with functional constipation. In order to determine the kind of stool passed, a Bristol chart was employed. The proforma had been filled by principal investigator. SPSS statistical software was used for all statistical analyses (version 25.0). Statistical significance was defined as two-sided values of <0.05.

Results:About 41.8% children were less than 5year of age group and 48.9% children were between age group 6-10years and 9.3% children belong to age group 11-14year. About 45.8% children were males and 54.2% children were females. About 37.2% children were from rural area and 62.8% children were from urban area. Maximum children (66.2%) had milk based diet. The *p*-value was 0.041366. About 55.8% children had inadequate water intake. The *p*-value was .001933. About 66.5% children played indoor games. The *p*-value was < .00001. About 31.7% children had bowel >2/week and 68.2% children had bowel <2/week. About 28.9% children had retentive posture. About 33.1% children had fecal incontinence and 85.5% children passed hard stool. The *p*-value was .046081. About 27.9% children passed Type 1 stool, 45.8% children passed Type 2 stool, 12.4% children passed Type 3 stool, 6.2% children passed Type 4 stool, 2.7% children passed Type 5 stool, 4.1% children pass type 6 stool and no children passed Type 7 stool. The *p*-value was < 0.00001. About (78.6%) children had recurrent abdominal pain. The *p*-value was .031733, and (49.6%) children had temper tantrum. The *p*-value was .044881.

Conclusion:The present study concluded that maximum children suffering from functional constipation had milk based diet, most of the children had inadequate water intake and played indoor games, maximum children had bowel movement <2/week

and passed hard stool, most of children passed Type 2 stool, maximum children had recurrent abdominal pain and temper tantrum.

Keywords: Functional constipation, Bristol stool chart, Rome IV criteria

INTRODUCTION

Functional constipation (FC) is a common pediatric healthcare problem worldwide, with reported prevalences ranging between 0.7 and 29.6 % and a mean female-to-male ratio of 2.1:1.¹ FC, also known as chronic idiopathic constipation, refers to chronic constipation formed by dysfunction or disturbance in the physiological functions of defecation for some reasons, except irritable bowel syndrome (IBS), and without organic lesions or structural abnormality resulting in difficulty in defecation.²⁻⁴ Regular bowel movements are important to your child's health. Bowel habits—how often, how much, and then on—will vary from child to child. Some children go quite once a day, while others may skip each day. The most common problems with bowel movements are constipation and diarrhea.⁵ Existing studies have shown that a sedentary lifestyle, dietary habits and types such as low vegetable and fruit intake (low dietary fiber), inadequate water intake, and low levels of education all contribute to an increased prevalence of FC.⁶ Rome IV defined, it include age equal to and more than 4 years and must include more than 2 of the following symptoms for more than 1 per week for more than 1 month with insufficient criteria to diagnose irritable bowel syndrome.

- * < 2 defecations in the toilet per week

- * > 1 episode of fecal incontinence per week

- * History of retentive posturing or excessive volitional stool retention

- * History of hard/painful bowel movements

- * History of large diameter stools that can obstruct the toilet

- * Presence of large fecal mass in the rectum

* After appropriate evaluation, symptoms cannot be fully explained by an other medical condition.⁷ Some authors stated that constipation treatment typically includes three phases: disimpaction (evacuation of the large fecal mass, days to weeks), laxative use (months), and a high-fiber diet (lifelong).⁸ Existing studies have shown that a sedentary lifestyle, dietary habits and types such as low vegetable and fruit intake (low dietary fiber), inadequate water intake, and low levels of education all contribute to an increased prevalence of FC.⁹ The present study was conducted to find out the bowel function, dietary habits and their association with physical and behavioral problems in children suffering from functional constipation.

MATERIAL & METHODS

The present cross sectional, descriptive study was conducted among 290 Children with functional constipation. All the children of age group 4 – 14 years attending Pediatric OPD and IPD, who Fulfilled ROME IV criteria for functional constipation were included in the study. Children with organic cause of constipation, Children who were already on regular treatment for more than 3 months, prescribed by practitioner for functional constipation, children who used to go for Open air defecation were excluded from the study. The demographic profile, socioeconomic status, detailed history, presenting complaints, bowel function, dietary habits, and behaviour problems such as temper tantrums, sibling rivalry, school phobia, and aversion to use school toilets were collected and recorded in pre-structured proforma in the local language. This study was carried out beginning in December 2020 after receiving clearance from the Research Advisory Committee (RAC) and the Institutional Ethics Committee (IEC) of PCMS and RC, Bhopal, respectively. Informed, written permission was taken from the patient after explaining them the study. An in-depth

examination of the patient's local, abdominal, and per rectal areas was performed. In order to determine the kind of stool passed, a Bristol chart was employed. The proforma had been filled by principal investigator. Pearson's χ^2 test was used to investigate the prevalence of FC and the symptoms mentioned in the Rome IV criteria. The associations between FC and physical status, such as height and weight, as well as energy and nutrient consumption, were originally investigated using t-tests, then analysis of covariance with age as a covariate was done to compare the FC and non-FC groups. Following that, binomial logistic regression analysis was used to discover characteristics that were independently linked with FC in children. SPSS statistical software was used for all statistical analyses (version 25.0). Statistical significance was defined as two-sided values of <0.05 .

RESULTS

Table 01: Demographic Distribution

S. No.	Gender	No.	Percentage	P Value
1	Male	133	45.8	.026538
2	Female	157	54.2	
S. No.	Age Group	No.	Percentage	P Value
1	< 5	121	41.8	.037182
2	06-10	142	48.9	
3	< 5	121	41.8	
4	06-10	142	48.9	
5	11-14	27	09.3	
S. No.	Demographic Profile	No.	Percentage	P Value
Rural				< .00001
1	Yes	108	37.2	
2	No	182	62.8	
Urban				
1	Yes	182	62.8	
2	No	108	37.2	

About 41.8% children were less than 5 year of age group and 48.9% children were between age group 6-10 years and 9.3% children belong to age group 11-14year. The chi-square statistic was 0.7997. The p -value was .037182. The result was significant at $p < .05$. About 45.8% children were males and 54.2% children were females. The chi-square statistic was 4.9207. The p -value was .026538. The result is significant at $p < .05$. About 37.2% children were from rural area and 62.8% children were from urban area. The chi-square statistic was 45.9258. The p -value was $< .00001$. The result was significant at $p < .05$.

Table 02: Habits

S. No.	Vegetables/Fruits	No.	Percentage	P Value
	Daily			.041366
1	Yes	114	39.3	
2	No	176	60.7	
	Occasionally			
1	Yes	176	60.7	
2	No	114	39.3	
	Milk Based Diet			
1	Yes	192	66.2	
2	No	98	33.8	
	Fried Items/Junk Food - Daily			
1	Yes	120	41.4	
2	No	170	58.6	
	Fried Items/Junk Food - Occasionaly			
1	Yes	109	37.5	
2	No	181	62.5	
S. No.	WATER INTAKE	No.	Percentage	P Value
1	Adequate	128	44.2	
2	Inadequate	162	55.8	
S. No.	Physical Activity	No.	Percentage	P Value
Outdoor Games			< .00001	
1	Yes	109	37.5	
2	No	181	62.5	
Indoor Games				
1	Yes	193	66.5	
2	No	97	33.5	
S. No.	Bowel Habits	No.	Percentage	P Value
<2/Week			.046081	
1	Yes	92	31.7	
2	No	198	68.3	
<2/Week				
1	Yes	198	68.2	
2	No	92	31.8	
	Retentive Posture			
1	Yes	84	28.9	
2	No	206	71.1	
	Fecal Incontinence			
1	Yes	96	33.1	
2	No	194	66.8	
	Pass Hard Stool			
1	Yes	248	85.5	
2	No	42	14.5	

About 39.35% children had fruits and vegetables daily and 60.7% children had fruits and vegetables occasionally. About 66.2% children had milk based diet and 41.4% children had fried item/junk food daily. About 37.5% children had fried item/junk food occasionally. The chi-square statistic was 47.8367. The p -value was 0.041366. The result was significant at $p < .05$. About 44.2% children had adequate water intake and 55.8% children had inadequate water intake. The chi-square statistic was 9.6125. The p -value was .001933. The result was significant at $p < .05$. Physical activities among study group results showed 37.5% children played outdoor games and 66.5% children played indoor games. The chi-square statistic was 48.7455. The p -value was $< .00001$. The result was significant at $p < .05$.

Table 03: Bristol Stool Chart

S. No.	Bristol Stool Chart	No.	Percentage	P Value
	TYPE 1 (Separate hard lumps)			< 0.00001
1	Yes	81	27.9	
2	No	209	72.1	
	TYPE 2 (Lumpy and sausage like)			
1	Yes	133	45.8	
2	No	157	54.2	
	TYPE 3 (A sausage shape with cracks in surface)			
1	Yes	36	12.4	
2	No	254	87.6	
	TYPE 4 (Like a smooth soft sausage or snake)			
1	Yes	18	6.2	
2	No	272	93.8	
	TYPE 5 (Soft blobs with clear cut edges)			
1	Yes	08	2.7	
2	No	282	97.3	
	TYPE 6 (Mushy consistency with ragged edges)			
1	Yes	12	4.1	
2	No	278	95.9	
	TYPE 7 (Liquid consistency with no solid pieces)			
1	Yes	00	0	
2	No	290	100	

About 27.9% children passed Type 1 stool, 45.8% children passed Type 2 stool, 12.4% children passed Type 3 stool, 6.2% children passed Type 4 stool, 2.7% children passed Type 5 stool, 4.1% children pass type 6 stool and no children passed Type 7 stool. The chi-square statistic was 286.6708. The p -value was < 0.00001 . The result was significant at $p < .05$.

Table 04: Clinical Symptoms

S. No.	CLINICAL SYMPTOMS	No.	Percentage	P Value
	Recurrent Abdominal Pain			.031733
1	Yes	228	78.6	
2	No	62	21.4	
	Blood Streaked Stools			
1	Yes	12	4.1	
2	No	278	95.9	
	Abnormal Posture			
1	Yes	12	4.1	
2	No	278	95.9	
	Fecal Soiling			
1	Yes	61	21.1	
2	No	229	78.9	
	Urinary Symptoms			
1	Yes	85	29.3	
2	No	205	70.7	
	Gerd	12	4.1	
1	Yes	278	95.9	
2	No			
	Others			
1	Yes	00	00	
2	No	290	100	

It was revealed that 78.6% children had recurrent abdominal pain and 4.1% children had blood streaked stools, About 4.1% children had abnormal posture and 21.1% children had fecal soiling, About 29.3% children had GERD. The chi-square statistic was 258.3115. The p -value was .031733. The result was significant at $p < .05$.

Table 5: Behavioural Problems

S. No.	Behavioural Problems	No.	Percentage	P Value
	Sibling Rivalry			.044881
1	Yes	110	37.9	
2	No	180	62.1	
	Temper Tantrum			
1	Yes	144	49.6	
2	No	146	50.4	
	School Phobia			
1	Yes	48	16.5	
2	No	242	83.5	
	Aversion To Use School Toilet			
1	Yes	134	46.2	
2	No	156	53.8	
	Others			
1	Yes	36	12.4	
2	No	254	87.6	

About 37.9% children had sibling rivalry and 49.6% children had temper tantrum. About 16.5% children had school phobia and 46.2% children had aversion to use school toilet. About 12.4% children had other behavioural problems. The chi-square statistic was 242.0967. The p -value was .044881. The result was significant at $p < .05$.

DISCUSSION

Functional constipation describes persistently difficult, infrequent, or seemingly incomplete defecation without evidence of a primary cause (anatomic, metabolic, or neurologic etc), this definition is operationalized by the "Rome IV" diagnostic criteria,⁹ which requires at least two of six symptoms describing stool frequency, hardness, large size, fecal incontinence, or volitional stool retention for at least two month.¹⁰

In the present study 41.8% children were less than 5 year of age group, About 48.9% children were between age group 6-10 years and 9.3% children belong to age group 11-14 year. The chi-square statistic was 0.7997. The p -value was .037182. The result was significant at $p < .05$. Kondapalli et al found, 57% of children had constipation in 2-4 years age group in their study.¹¹

In the present study about 45.8% children were males and 54.2% children were females. The chi-square statistic was 4.9207. The p -value was .026538. The result is significant at $p < .05$. Kondapalli CS et al found that out of 202 children with functional constipation, 110 were girls and boys were 92.¹¹ In the present study about 37.2% children were from rural area and 62.8% children were from urban area. The chi-square statistic was 45.9258. The p -value was $< .00001$. The result was significant at $p < .05$. Mazumder MW et al included a total of 179 subjects in the final analysis. Among them 55.31% were living in urban where as 44.69% in rural area.¹² About 39.35 children had fruits and vegetables daily, 60.7% children had fruits and vegetables occasionally. About 66.2% children had milk based diet and 41.4% children had fried item/junk food daily. About 37.5% children had fried item/junk food occasionally. The chi-square statistic was 47.8367. The p -value was 0.041366. The result was significant at $p < .05$. Mazumder MW et al found that low fiber diet was found in 72.63% children with constipation, among other probable causes, ingestion of cow's milk 32.96%, not having

regular meals with parents 19.55%, consumption of junk foods was found in 28.49% cases.¹² About 44.2% children had adequate water intake and 55.8% children had inadequate water intake. The chi-square statistic was 9.6125. The p -value was .001933. The result was significant at $p < .05$. In the study by **Chan et al.**¹³, the authors verified that the intake of three to four glasses of liquids (200 ml/glass) contributes to a lower occurrence probability of constipation in children, while in the study by Park et al.¹⁴, it was observed that the daily water intake of 500 ml or less was a predictor of intestinal constipation in children. About 37.5% children were involved in outdoor games and 66.5% children played indoor games. The chi-square statistic was 48.7455. The p -value was $< .00001$. The result was significant at $p < .05$. Less physical activity was found in 7.23%.¹²

In the present study About 31.7% children had bowel >2 /week and 68.2% children had bowel <2 /week. About 28.9% children had retentive posture, 33.1% children had fecal incontinence. And 85.5% children passed hard stool. The chi-square statistic was 259.8846. The p -value was .046081. The result was significant at $p < .05$. Children who passed stools greater than or equal to 3 times per week $n=40$ (19.8%) had pellet like stool with incomplete bowel emptying. The average stools passed per week in this group is 2.044. 58.4% of children with functional constipation had retentive behavior in the form of abnormal posturing.¹¹ Wald et al found retentive behavior to be more common in boys.¹⁵

In the present study 27.9% children passed Type 1 stool, 45.8% children passed Type 2 stool, 12.4% children passed Type 3 stool, 6.2% children passed Type 4 stool, 2.7% children passed Type 5 stool, 4.1% children pass type 6 stool and no children passed Type 7 stool. The chi-square statistic was 286.6708. The p -value was < 0.00001 . The result was significant at $p < .05$. In a study by Kondapalli CS et al, the stool type in them was type I in 18 (8.9%) and type II in 75 (37.1%) and type III in 104 (51.4%), type IV in 5 (2.47%) according to the Bristol stool chart.¹¹ In the Santos-Andreoli C, study, it was observed, according to the Bristol scale, that only 8.2% of the children with constipation presented soft stools (type 4).¹⁶

About 78.6% children had recurrent abdominal pain and 4.1% children had blood streaked stools and 4.1% children had abnormal posture, 21.1% children had fecal soiling, 29.3% children had GERD. The chi-square statistic was 258.3115. The p -value was .031733. The result was significant at $p < .05$. Constipation was the presenting complaint in 76.54% subjects, other complaints were abdominal pain 47.49%, anorexia 24.02%, vomiting 19.56%.¹² In **Kondapalli CS study**, recurrent abdominal pain was the presenting complaint in 30.6% of children, it was present equally in boys and girls ($n=31$).¹¹ About 37.9% children had sibling rivalry. 49.6% children had temper tantrum. 16.5% children had school phobia. 46.2% children had aversion to use school toilet. 12.4% children had other behavioural problems. The chi-square statistic was 242.0967. The p -value was .044881. The result was significant at $p < .05$. **Lundblad et al** in her study observed that 63% of school children do not use the school toilet to defecate. 16% of them never urinate and 15% of children always try to avoid using the toilet. So, the author feels that there is a precarious, situation for school children undergoing treatment of bladder and bowel dysfunction. Moreover, irregular toilet habits are contributing factors to functional constipation.¹⁷ In this study, there was an aversion to use school toilet in 37.1%.¹¹

CONCLUSION

The present study concluded that maximum children suffering from FC has less physical activity, eat more junk food and less vegetables and fruits and passed Type 2 stool.

Moreover, factors related to lifestyle, sedentary behaviour and eating habits are important elements to be investigated while evaluating the functional constipation in children. Therefore, actions are suggested in schools involving nutritional education and a habit that promotes healthy lifestyle in the family, since the prevention of functional constipation requires changes in the lifestyle from both the child and their family.

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