International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Constipation in Children and Adolescent: A Hospital Based Study of Clinical Presentation with Respect to Etiology

Dr. Siddharth Jain[1], Dr. Gunjan Kela[2], Dr. Nida Mirza[3]

[1]PG Resident, Department of Paediatrics, Sri Aurobindo Medical College & P.G. Institute, Indore.
Corresponding Author Email: *Dr Siddharth Jain.emailid[at]gmail.com*
Mobile: 95895 22533

[2]Professor & HOD, Department of Paediatrics, Sri Aurobindo Medical College & P.G. Institute, Indore
Dr Gunjan Kela.emailid[at]gmail.com

[3]Assistant Professor, Department of Paediatrics, Sri Aurobindo Medical College & P.G. Institute, Indore
Email: *Dr Nida Mirza.emailid[at]gmail.com*

Abstract: ***Background: Constipation remains a frequent presentation to paediatricians, with significant health resource implications. Further, a lack of a generally accepted definition makes it challenging. Functional constipation is the most common presentation in children however in developing countries like India it is believed to be uncommon. In advent of same, this hospital-based study was undertaken to evaluate the etiology and clinical spectrum in patients with constipation according to age group and gender in children and adolescent. Material & Method: 100 patients attending the OPD with constipation history (2 or more than 2 weeks), both organic and non-organic (functional) and meeting the inclusion and exclusion criteria were enrolled for the study. Statistical analysis was done to to show the features and characteristics of collected data. Results: Out of 100 patients, 52% were male. The most commonly affected age group was school age (30%) followed by infants (26%), pre-school children (25%) and adolescents (19%). There were no statistical gender differences in any age group. The comparison of mean duration for relief among different age group shows the non-significant difference (P>0.05). Functional constipation (75%) was the most common case of constipation and occurred maximally in the pre-school age group. Hirschsprung's disease was responsible for 24% of cases of organic constipation. A statistically significant correlation was observed for comparison of mean Hemoglobin among different age group (P<0.05). Conclusion: Constipation occurs quite frequently among Indian children with functional constipation being the most common cause.***

Keywords: Paediatric constipation, Functional, Etiology, Clinical profile, Adolescent

1. Introduction

Constipation remains a frequent presentation to pediatricians, with significant health resource implications. **Constipation** was defined as difficulty in defecation or infrequent bowel movements for two or more weeks and sufficient enough to cause significant distress. [1]

In general population, the prevalence of childhood constipation varies widely ranging from 0.7% to 29.6% (median 10.4%)[2] and is more frequent when dietary fiber intake is restricted. It accounts for upto 3% of visits to general pediatric clinics and as many as 25-30% of visits to pediatric gastroenterologists.[3-5]

Normal Bowel Habit in Children with considerable variation in 'normal' bowel habit in children is acceptable. In a UK-based study of 350 preschoolers (ages 1-4), 96% of the children had an alternate day of 3 or more bowel movements.[6] Additionally age-dependent is bowel frequency. In research involving 800 infants, Nyhan found that the frequency peaked at 4.4 per day at 5 days of age and that it may even reach 13 per day in breast-fed children.[7] The time to first stool after meconium transit is the same in all groups, despite the possibility that breast-fed and bottle-fed infants have different stools more frequently.[8]

A key problem in research regarding childhood constipation is the lack of a generally accepted definition for pediatric constipation. Constipation is often interpreted differently by patients and physicians. In children it is difficult to define constipation, because the physician often relies on the symptom interpretation by parents.

Recently, several definitions for childhood constipation have been proposed for clinical and research purposes. The ROME II criteria, defined by a group of experts, described a spectrum of pediatric defecation disorders including infant dyschezia, functional constipation, functional fecal retention and functional non retentive fecal soiling.[9] The North American Society of Gastroenterology and Nutrition (NASPGHAN) defined constipation as a delay or difficulty in defecation, present for 2 wk or more, and sufficient to cause significant distress to the patient.[10] The most recent criteria for functional constipation in children were described by the Paris Consensus on Childhood Constipation Terminology (PACCT) group, which read: a period of 8 wk with at least two of the following symptoms; defecation frequency1/wk, passage of large stools that clog the toilet, palpable abdominal or rectal fecal mass, stool withholding behavior or painful defecation.[11]

Parents who have children who frequently experience constipation are concerned that there might be a significant underlying illness. However, only a small percentage of

children actually have an organic aetiology behind their constipation. Beyond the neonatal period, functional constipation (i.e., without objective evidence of a pathological condition) is the most common cause.[12]

The most frequent cause of functional constipation is painful bowel motions that force the child to voluntarily withhold stool and adopt a retentive posture. Fecal stasis, which results from the withholding of stool, causes the colon to absorb fluid again, making the stool thick, solid, and difficult & painful to pass. The rectal sensation then declines as the rectum stretches to make room for these retained feces, and fecal incontinence can develop as a consequence. This cycle frequently happens in conjunction with toilet training, dietary changes, stressful situations, illness, a lack of readily available restrooms, or in a distracted child who postpones defecation.[13]

In developing countries like India, it is widely believed that functional constipation is uncommon presumably due to high fiber content in their diet. However, there is a paucity of research studies done in India to gauge the true size of the problem and to assess the relative frequency of gastrointestinal symptomatology among children with constipation. Hence, this hospital-based study was undertaken to evaluate the etiology and clinical spectrum in patients with constipation according to age group and gender in children and adolescent.

2. Material & Method

After approval from the institutional ethical committee, the present cross-sectional study was conducted in the OPD of Department of Pediatrics at Tertiary care Centre, Sri Aurobindo Medical College & P.G. Institute, Indore, from 1st April 2021 to 30th September 2022. 100 patients attending the OPD with constipation history (2 or more than 2 weeks), both organic and non-organic (functional) and meeting the inclusion and exclusion criteria were enrolled for the study.

Inclusion Criteria: All children from 0 to 18 years of age, with constipation history of 2 or more than 2 weeks consenting (parents/guardian) for the study were included.

Exclusion Criteria:

- Children with constipation for less than 2 weeks.
- Children who attained control before 24 months were excluded.
- Children with non-consenting parents/guardian were excluded from the study.

Method

A pre-informed written consent was taken from parents/guardians of all 60 participants who qualified the inclusion criteria and were enrolled for the study. Patients were divided into four groups according to age:

- Infants (0-23.9 months),
- Pre-school (2-6 years),
- School-age (6-12 years), and
- Adolescents (12-18 years).

Patients with chronic constipation will be analyzed for clinical, etiological, demographic details and other lab parameters.

At the very first visit, detailed history was taken from the patient/guardian including presenting complaints such as age at presentation, duration of constipation, bowel motion frequency, bowel motion consistency, pain with defecation, stool withholding behavior, presence of blood with bowel motion, fecal incontinence, and the presence of fecal impaction or an abdominal mass associated symptom.

Physical examination, including digital per rectal examination, was done the same day. The latter was deferred in cases of painful anal fissure or patient/parental refusal.

Relevant investigations were done to rule out organic pathologies when suspected. Thyroid profile was done in suspected cases of hypothyroidism. Functional constipation was diagnosed based on ROME III criteria.[14]

Children up to 4 Years[15]

At least 2 of the following symptoms must occur for at least 1 month:

- ≤2 defecations per week
- ≥1 episode per week of incontinence after the acquisition of toileting skills
- History of excessive stool retention
- History of painful or hard bowel movements
- Presence of a large fecal mass in the rectum and
- History of large-diameter stools that may obstruct the toilet.

Children above 4 Years and Adolescents[16]

Symptoms must occur at least once per week for at least 2 months and include 2 or more of the following in a child with a developmental age of >4 years with insufficient criteria of irritable bowel syndrome:

- Two or fewer defections in the toilet per week
- At least 1 episode of fecal incontinence per week
- History of retentive posturing or excessive volitional stool retention
- History of painful or hard bowel movements
- Presence of a large fecal mass in the rectum
- History of large-diameter stools that may obstruct the toilet.

Fecal impaction was defined as a hard mass palpable in the lower abdomen or a dilated rectum with large amount of hard stool on per rectal examination.

Stool avoidance behavior (withholding), often misinterpreted as straining, was considered in infants with back-arching, and in older infants/toddlers, with standing on toes, extending legs or rocking back and forth to prevent anal relaxation. Some children tend to hide in a corner standing stiffly or squatting.[17]

Fecal incontinence: More recently, the term **'non-retentive faecal soiling'** was defined as repetitive, involuntary passage of any amount of feces, at an inappropriate place once a week or more after attainment of toilet skills. It has

been described for children soiling without difficult infrequent defecation. PACCT (The Paris Consensus on Childhood Constipation Terminology Group) have defined this as passage of stools in an inappropriate place, occurring in children with a mental age of 4 years and older, with no evidence of constipation on history or examination. [18]

Hirschsprung's disease (HD) was diagnosed only after rectal/colonic biopsy showed the absence of ganglion cells. In suspected cases of spinal abnormalities, magnetic resonance imaging of the spine was done.

Celiac disease was diagnosed if the patient had positive tissue transglutaminase titers and jejunal biopsy was consistent with celiac disease.

Cow's milk protein allergy was diagnosed if elimination of cow's milk resulted in improvement of symptoms and when recurrence of symptoms was seen after reintroduction of cow's milk.

Statistical Analysis

Statistical analysis was done by SPSS statistical software. Continuous variables, such as age, were summarized as mean standard deviation [SD]. Distributive statistics will be used to show the features and characteristics of collected data. Inferential analysis for quantitative variables will be done using t-test whereas analysis for qualitative data will be done using chi-square test. A probability value (P-value) <0.05 will be considered as significant.

3. Results

A total of 100 children with constipation were included in the study. Of the 100 patients, 52 (52%) were male. A male preponderance was noticed in all the age groups except in the preschool and adolescent children. However, no statistically significant gender difference was noticed in any age group.

The most commonly affected age group was the school age (30%) followed by infants (26%), pre-school children (25%) and adolescents (19%). The average duration of constipation progressively increased with age from infants to preschool but showed a decrease till adolescents. The comparison of mean duration for relief among different age group shows the non-significant difference (P>0.05). The mean duration for relief was highest in preschool group i.e., 37.68 and lowest in adolescents i.e., 19.16.

Amongst the clinical presentation hard, dry and painful defecation were the most common manifestations (85%) and were maximally seen in the pre-school age group. The second most common was fecal impaction (55%) and was observed more commonly in adolescent age group children (80%) followed by pre-school children (72%). Fecal incontinence was most prevalent in boys (32%) than in girls (23%). Withholding behavior was observed more prevalently in infants and pre-school children.

Abdominal pain was most prevalent in adolescent age children (52%) showing a progressive increase with age. Pain in abdomen, blood in stools and abdominal distension were more commonly seen in girls as compared to boys with a statistically significant correlation only for abdominal distension (P<0.05) 52% children showed fecal mass in rectum during per rectal physical examination with constipation. This was more prevalent in boys (P = 0.011).

Functional constipation was the most common diagnosis (75%) and was seen most commonly in the pre-school age group (90.66%). The etiological spectrum is displayed in Table 4. Hirschsprung disease was responsible for 24% of cases of organic constipation and comprised 10% of the total cases of constipation. Other organic causes included hypothyroidism (12%), severe anemia with constipation (3.33%), UTI with constipation (3.33%), Viral hepatitis (3.33%). Rest contributed 1.67% cases each i.e., Acute abdomen, ADHD with Intellectual disability with drug induced constipation, Anal fissure, carolis disease, cerebral palsy, developmental delay with constipation, Diabetic ketoacidosis with constipation and Gastritis with constipation

The association between Age group and sex was found to be statistically non-significant ((P>0.05). The proportion of male and female in all the age groups shows almost similar proportions. The comparison of mean Hemoglobin among different age group shows the significant difference (P<0.05). The mean Hb was highest 13.21 for 0-2 years and lowest 11.64 years for age group 2.1-6 years. Post hoc Tukey test was applied to compare the mean value of individual age groups. The difference between age group 0-2 years and 2.1-6 years and age group 2.1-6 years and 12.1-18 years was found to be significant (P<0.05), whereas all other comparisons show non-significant differences. (P>0.05)

Table 1: Patient distribution by age, sex, and duration of constipation

Sex	Age Group				Total
	0-2 Years	2.1-6 Years (Playschool)	6.1-12 Years (School Age)	12.1-18 Years (Adolescent)	
Patient	26	25	30	19	100
Male	15 (57.7%)	12 (48%)	16 (53.3%)	9 (47.4%)	52
Female	11 (42.3%)	13 (52%)	14 (46.7%)	10 (52.60%)	48
Pearson Chi-Square	Value	Df	P Value	Result	
	0.682	3	0.877	Non Sig	

Table 2: Patient distribution by age and duration of constipation

Age Group	N	Mean Duration	SD	F Test	P Value	Result
0-2 Years	26	29.08	29.41	2.112	0.104	Non Sig
2.1-6 Years (Preschool)	25	37.68	26.36			
6.1-12 Years (School Age)	30	27.27	22.16			
12.1-18Years (Adolescent)	19	19.16	16.99			
Total	100	28.8	24.94			

Table 3: Patient distribution by age and hemoglobin

Age Group	N	Mean Hb	SD	F Test	P Value	Result
0-2 Years	26	13.21	1.58	4.825	0.004	Significant
2.1-6 Years (Preschool)	25	11.64	2.23			
6.1-12 Years (School Age)	30	12.25	1.22			
12.1-18 Years (Adolescent)	19	13.11	1.54			
Total	100	12.51	1.76			

Table 4: Etiology of constipation in study subjects

Diagnosis	**Frequency**	**Percent**
Functional Constipation	75	75
Other causes of constipation	25	25
Total	100	100
Other causes of constipation	**Frequency**	**Percent**
Acute abdomen	1	4
ADHD with Intellectual disability with drug induced constipation	1	4
Anal fissure	1	4
carolis disease	1	4
cerebral palsy	1	4
developmental delay with constipation	1	4
Diabetic ketoacidosis with constipation	1	4
Gastritis with constipation	1	4
Hirschsprung disease	6	24
Hypothyroidism	3	12
Inflammatory bowel disease	1	4
Intussusception	1	4
severe anaemia with constipation	2	8
UTI with constipation	2	8
viral hepatitis	2	8
Total	25	100

4. Discussion

In our study, patients were divided into four age groups: Infants; pre-school children; school-age children; and adolescents. Male preponderance (52%) was noticed both in the functional and organic constipation groups which was in concurrence with study done by Bansal R et al.[19] However, contrasting results were obtained in previous anecdotal studies done by de Lorijn F et al. who have reported higher prevalence in girls,[20] whereas no gender difference was reported by van den Berg et al.[2] & Clayden GS et al.[21]

The most commonly affected age group was the school age (30%) followed by infants (26%), pre-school children (25%) and adolescents (19%). The average duration of constipation progressively increased with age from infants to preschool but showed a decrease till adolescents. However, in a study done by Bansal R et al, pre-school children (46.15%) were most commonly affected.

Maximum children in the school age group from complained of hardened, dried and painful defecation. In our study, we found that adolescents had a longer duration of symptoms, less frequent bowel motions, and higher prevalence of fecal impaction. The mean duration for relief was highest in preschool group i.e., 37.68 and lowest in adolescents i.e., 19.16. Amongst the clinical presentation hard, dry and painful defecation were the most common manifestations (85%) and were maximally seen in the pre-school age group. The findings were consistent with Bansal R et al.[19], de Lorijn F et al.[20], Voskuijl WP et al. & Kammacher Guerreiro M et al. Hence, it is suggested that stool consistency and painful defecation is more sensitive parameter to diagnose constipation. Pain abdomen was reported in only 15% of constipated children and the prevalence progressively increased with age.

Withholding behavior or retentive posturing is a characteristic feature of FC and is seen in 50-60% cases with more prevalent in infants and pre-school children. This was consistent with previous studies.[10,16,19,22,24] This behavior was exhibited by only 33.33% of our study cases of FC, probably due to misinterpretation of symptoms by parents as “straining” which was in concurrence with studies done by various authors. [10,19,25.26]

Functional constipation was the most common diagnosis (75%) whereas 25% of our patients had an organic cause for constipation. These results are in agreement with previous studies,[19,20,23] including one from India, which showed the

prevalence of organic constipation to be 14.6% and 18.3%, respectively. These figures are higher than reported in developed countries i.e., approximately 5-10%.[27,28] History of delayed passage of meconium, abdominal distension, and absence of fecal impaction are suggestive of an organic pathology, whereas fecal incontinence, fecal impaction, and withholding behavior are pointers toward FC.[19,20] Our study was concurrent with this fact.

Hirschsprung disease was responsible for 24% of cases of organic constipation and comprised 10% of the total cases of constipation. This was higher than as reported by Bansal R et al.[19] & Altamimi E et al.[26] Other organic causes included hypothyroidism (12%), severe anemia with constipation (3.33%), UTI with constipation (3.33%), Viral hepatitis (3.33%). Rest contributed 1.67% cases each i.e., Acute abdomen, ADHD with Intellectual disability with drug induced constipation, Anal fissure, carolis disease, cerebral palsy, developmental delay with constipation, Diabetic ketoacidosis with constipation and Gastritis with constipation

As the number of adolescent patients were less as compared to other age groups in our study it limits the generalization of our results in this age group. Further we did not discuss the treatment of constipation among pediatric patients which is another limitation to our study.

On a positive side, the study highlighted the clinical spectrum of pediatric constipation according to age group and gender; furthermore, it dredges into the underlying causes of constipation and their associated symptomatology.

To summarize, functional constipation (FC) was the most common cause of constipation in children in our study, and only 25% patients have an organic pathology. Thus, highlighting the fact that pediatricians should refrain from doing extensive investigations, especially to rule out HD in all cases of paediatric constipation.

5. Conclusion

This study provides evidence that functional constipation is the most common cause of constipation and that it affects Indian youngsters relatively frequently. The more sensitive criteria for diagnosing constipation are the consistency of the stool and painful defecation. Males are more likely to be impacted than females, especially in cases of organic (pathologic) constipation, which affects preschoolers more frequently.

References

[1] Baker SS, Liptak GS, Colletti RB, Croffie JM, Di Lorenzo C, Ector W, et al. Constipation in infants and children: Evaluation and treatment. A medical position statement of the North American Society for Pediatric Gastroenterology and Nutrition. J Pediatr Gastroenterol Nutr 1999;29:612-26.
[2] van den Berg MM, Benninga MA, Di Lorenzo C Epidemiology of childhood constipation: A systematic review. Am J Gastroenterol 2006;101:2401-9.
[3] Partin JC, Hamill SK, Fischel JE, Partin JS. Painful defecation and fecal soiling in children. Pediatrics 1992;89:1007-9.
[4] Loening-Baucke V. Constipation in early childhood: Patient characteristics, treatment, and longterm follow up. Gut 1993;34:1400-4.
[5] Croffie JM. Constipation in children. Indian J Pediatr 2006;73:697-701.
[6] Weaver LT, Steiner H: The bowel habit of young children. Arch Dis Child 1984, 59:649-652.
[7] Nyhan WL: Stool frequency of normal infants in the first week of life. Pediatrics 1952, 10:414-425.
[8] Metaj M, Laroia N, Lawrence RA, Ryan RM: Comparison of breast- and formula-fed normal newborns in time to first stool and urine. J Perinatol 2003, 23:624-628.
[9] Rasquin-Weber A, Hyman PE, Cucchiara S, et al. Childhood functional gastrointestinal disorders. Gut 1999;45:60–8.
[10] Baker SS, Liptak GS, Colletti RB, et al. Constipation in infants and children: Evaluation and treatment. A medical position statement of the North American Society for Pedi atric Gastroenterology and Nutrition. J Pediatr Gastroenterol Nutr 1999;29:612–26.
[11] Benninga M, Candy DC, Catto-Smith AG, et al. The Paris Consensus on Childhood Constipation Terminology (PACCT) Group. J Pediatr Gastroenterol Nutr 2005;40:273– 5
[12] Bansal R, Agarwal AK, Chaudhary SR, Sharma M. Clinical Manifestations and Etiology of Pediatric Constipation in North India. Int J Sci Stud 2016;4(2):185-190.
[13] Karami H, Shokohi L. Management of childhood constipation. J Pediatr Rev 2013;1:45-51.
[14] Loening-Baucke V: Constipation in early childhood: patient characteristics, treatment, and longterm follow up. Gut 1993, 34:1400-1404
[15] Hyman PE, Milla PJ, Benninga MA, Davidson GP, Fleisher DF, Taminiau J. Childhood functional gastrointestinal disorders: Neonate/toddler. Gastroenterology 2006;130:1519-26.
[16] Rasquin A, Di Lorenzo C, Forbes D, Guiraldes E, Hyams JS, Staiano A, et al. Childhood functional gastrointestinal disorders: Child/adolescent. Gastroenterology 2006;130:1527-37.
[17] Afzal NA, Tighe MP, Thomson MA. Constipation in children. Ital J Pediatr 2011;37:28.
[18] Rajindrajith S, Devanarayana NM, Benninga MA. Review article: Faecal incontinence in children: Epidemiology, pathophysiology, clinical evaluation and management. Aliment Pharmacol Ther 2013;37:37-48.
[19] Bansal R, Agarwal AK, Chaudhary SR, Sharma M. Clinical Manifestations and Etiology of Pediatric Constipation in North India. Int J Sci Stud 2016;4(2):185-190.
[20] de Lorijn F, van Wijk MP, Reitsma JB, van Ginkel R, Taminiau JA, Benninga MA. Prognosis of constipation: Clinical factors and colonic transit time. Arch Dis Child 2004;89:723-7.
[21] Clayden GS. Management of chronic constipation. Arch Dis Child 1992;67:340-4.

[22] Voskuijl WP, Heijmans J, Heijmans HS, Taminiau JA, Benninga MA. Use of Rome II criteria in childhood defecation disorders: Applicability in clinical and research practice. J Pediatr 2004;145:213-7.
[23] Kammacher Guerreiro M, Bettinville A, Herzog D. Fecal overflow often affects children with chronic constipation that appears after the age of 2 years. Clin Pediatr (Phila) 2014;53:885-9
[24] Martinez-Costa C, Palao Ortuno MJ, Alfaro Ponce B, Nunez Gomez F, Martinez-Rodriguez L, Ferre Franch I. et al. Functional constipation: Prospective study and treatment response. An Pediatr (Barc) 2005;63:418-25
[25] Dehghani SM, Kulouee N, Honar N, Imanieh MH, Haghighat M, Javaherizadeh H. Clinical manifestations among children with chronic functional constipation. Middle East J Dig Dis 2015;7:31-5.
[26] Altamimi E. Clinical characteristics of pediatric constipation in South Jordan. Pediatr Gastroenterol Hepatol Nutr 2014;17:155-61.
[27] Medeiros LC, Morais MB, Tahan S, Fukushima E, Motta ME, Fagundes Neto U. Clinical characteristics of pediatric patients with chronic constipation according to age group. Arq Gastroenterol 2007;44:340-4.
[28] Loening-Baucke V Prevalence, symptoms and outcome of constipation in infants and toddlers. J Pediatr 2005;146:359-63.