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Original Research Article

Assessment of Prevalence of Functional Constipation in Indian Children: A Cross-Sectional Hospital-Based Study

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Abstract

Background: Functional constipation is a common but often overlooked issue in pediatric populations, with consequences on nutrition, growth, and psychosocial well-being. Prevalence varies across regions, and cultural differences may affect diagnostic criteria.

Objective: To assess the prevalence of functional constipation among children using a questionnaire based on Indian Academy of Pediatrics (IAP) consensus and modified Bristol Stool Form Scale (m-BSFS) and determine the agreement between both tools.

Methods: A hospital-based cross-sectional study was conducted at Fortis Escorts Hospital, Jaipur, from January 2020 to March 2021. A total of 273 children attending the pediatric outpatient department were assessed for functional constipation using a validated questionnaire and m-BSFS.

Results: Prevalence of functional constipation was 10.6% by IAP consensus and 8.8% by m-BSFS. Most affected age group was 1–5 years. Constipation was more common in males. A statistically significant agreement was observed between the two tools (κ=0.77, $p<0.001$).

Conclusion: Functional constipation is prevalent in Indian children, especially preschoolers. Both IAP consensus and m-BSFS are reliable and complementary tools for diagnosis and can reduce unnecessary investigations when used effectively in outpatient settings.

Keywords: Functional constipation, Indian children, prevalence, IAP consensus, m-Bristol stool scale, pediatric, Rome criteria.

Introduction

Constipation is a common pediatric concern, often characterized by infrequent, difficult, or painful defecation. Functional constipation—defined as constipation without an identifiable organic cause—is the most frequent type in children and accounts for a significant number of pediatric outpatient visits and referrals to gastroenterologists [1,2]. Globally, the prevalence of childhood constipation varies from 0.7% to 29.6%, with a median of 12% [3]. Indian studies suggest similar prevalence, although underreporting is likely due to stigma, lack of awareness, and the belief that constipation is not a medical issue [4,5]. Cultural factors like high-fiber diets, toilet habits, and lifestyle differences further influence reporting and diagnosis [6].

Children with functional constipation commonly present with stool withholding behavior, passage of hard or painful stools, infrequent defecation, and sometimes fecal incontinence [7,8]. If untreated, it may lead to chronic abdominal pain, poor appetite, psychosocial issues, and impaired quality of life [9]. Standard diagnostic criteria such as the PACCT and Rome criteria have improved classification of functional gastrointestinal disorders [10,11]. However, these are often based on Western populations and may not fully apply to Indian children. Recognizing this, the Indian Academy of Pediatrics (IAP) developed its own consensus criteria for functional constipation in the Indian context [12].

Stool consistency is an important clinical marker, and the Bristol Stool Form Scale (BSFS) has been widely used to assess this. However, the original scale was adult-oriented. A modified BSFS (m-BSFS) has since been validated for pediatric use [13]. This study was undertaken to assess the prevalence of functional constipation among Indian children using the IAP consensus questionnaire and m-BSFS, and to determine the level of agreement

between the two tools. Establishing their concordance may improve early diagnosis and reduce the need for costly investigations in pediatric practice.

Materials and Methods

This study was designed as a cross-sectional observational analysis and conducted at the pediatric outpatient department of Fortis Escorts Hospital, Jaipur, over a period of 15 months from January 2020 to March 2021. The study aimed to assess the prevalence of functional constipation in children using two assessment tools: a questionnaire based on the Indian Academy of Pediatrics (IAP) consensus and the modified Bristol Stool Form Scale (m-BSFS).

All children attending the pediatric OPD during the study period were screened. Inclusion criteria included all children from birth to 18 years of age, while those with incomplete questionnaires, lack of informed consent, or an identifiable organic cause for constipation (such as Hirschsprung disease, anal anomalies, intestinal obstruction, or anal fissures) were excluded. Due to the COVID-19 pandemic and its impact on outpatient services, the intended sample size of 138 (calculated based on an estimated 10% prevalence and 5% allowable error) was exceeded to include all eligible children, yielding a final study population of 273 subjects.

Each child's caregiver completed a pretested, self-designed questionnaire based on the IAP consensus, which included questions on stool frequency, consistency, withholding behavior, painful defecation, fecal incontinence, appetite, and irritability. To assess stool form, caregivers were shown a pictorial chart of the m-BSFS and asked to identify the stool type most commonly passed by the child.

Data were collected in the presence of a primary caregiver to minimize observer bias. Children were categorized as having functional constipation if they fulfilled at least two criteria from the IAP consensus questionnaire. In the m-BSFS, stool types 1 and 2 were considered indicative of constipation. The responses were compiled using Microsoft Excel and analyzed using SPSS version 25.0. Quantitative data were expressed as mean and standard deviation, while qualitative data were expressed as percentages. Chi-square tests were used to compare categorical variables, and Cohen's Kappa statistic was applied to determine agreement between the IAP and m-BSFS criteria. A p-value of less than 0.05 was considered statistically significant. Ethical approval was obtained from the institutional ethics committee, and informed consent was secured from all participants' parents or guardians.

Observation and results

A total of 273 children attending the pediatric outpatient department were included in the study. Of these, 136 (49.8%) were male and 137 (50.2%) were female. The majority of children were in the 6–10 years age group (38.5%), followed by 1–5 years (35.5%), 11–15 years (17.6%), 16–18 years (4.4%), and <1 year (4.0%).

Based on the IAP consensus questionnaire, 29 children (10.6%) were identified as having functional constipation. According to the m-BSFS, 24 children (8.8%) had hard stool consistency (Type 1 or 2), consistent with functional constipation.

Table 1: Distribution of responses to IAP consensus-based questionnaire (n = 273)

IAP Criteria Question	Yes (n)	Yes (%)	No (n)	No (%)
Stool frequency ≤2 per week	8	2.9%	265	97.1%
At least one episode of fecal incontinence per week (age >2 years)	6	2.2%	240	87.9%
Withholding behavior (e.g., stool holding postures)	27	9.9%	246	90.1%
Hard stool or pain during defecation	33	12.1%	240	87.9%
History of large stools obstructing toilet	17	6.2%	256	93.8%
Decreased appetite relieved after passing stools	25	9.2%	248	90.8%
Irritability relieved after defecation	19	7.0%	254	93.0%
Presence of blood in stool (excluded from functional constipation group if present)	0	0.0%	273	100.0%

Table 1 offers a comprehensive overview of the key symptoms assessed through the IAP-based questionnaire and highlights which symptoms were more frequently reported.

For example, hard or painful stool was the most commonly endorsed symptom (12.1%), while fecal incontinence and very infrequent stools were reported less frequently.

The highest prevalence of functional constipation was observed in the 1–5 years age group, followed by 6–10 years. The 16–18 years group had no reported cases.

Table 2: Age-wise prevalence of functional constipation (n=273)

Age Group	Total (n)	IAP Criteria: Constipated (%)	m-BSFS: Constipated (%)
<1 year	11	1 (9.1%)	1 (9.1%)
1–5 years	97	14 (14.4%)	12 (12.4%)
6–10 years	105	11 (10.5%)	9 (8.6%)
11–15 years	48	3 (6.2%)	2 (4.2%)
16–18 years	12	0 (0%)	0 (0%)
Total	**273**	**29 (10.6%)**	**24 (8.8%)**

A slightly higher prevalence of constipation was observed in male children compared to females across both diagnostic tools (table 2).

Table 3: Gender-wise prevalence of functional constipation (n=273)

Gender	Total (n)	IAP Criteria: Constipated (%)	m-BSFS: Constipated (%)
Male	136	17 (12.5%)	15 (11.0%)
Female	137	12 (8.8%)	9 (6.6%)
Total	**273**	**29 (10.6%)**	**24 (8.8%)**

To assess the level of agreement between the IAP consensus and m-BSFS, Cohen's Kappa statistic was used. Substantial agreement was observed with a kappa value of 0.77, and the result was statistically significant ($p < 0.001$) (table 3).

Table 4: Agreement between IAP consensus and m-BSFS criteria

	m-BSFS Constipated	m-BSFS Not Constipated	Total
IAP Constipated	21	8	29
IAP Not Constipated	3	241	244
Total	**24**	**249**	**273**

Kappa value: 0.77; p-value: <0.001

These results indicate that both tools are reliable for identifying functional constipation in children, with the IAP consensus slightly more sensitive, while m-BSFS provides a simple visual assessment of stool consistency (table 3).

Discussion

This cross-sectional study assessed the prevalence of functional constipation among Indian children using two different diagnostic tools: the Indian Academy of Pediatrics (IAP) consensus-based questionnaire and the modified Bristol Stool Form Scale (m-BSFS). Among the 273 children included, a prevalence of 10.6% was observed using IAP criteria and 8.8% using m-BSFS. These results are consistent with global prevalence rates, where childhood constipation has been reported to range between 0.7% and 29.6%, with a median of 12% [3]. Indian studies, including those by Ghoshal et al. and Khanna et al., have also reported prevalence rates in the range of 10–17%, supporting our findings [4,5]. However, variation in diagnostic criteria, dietary practices, and reporting behavior may explain the range of prevalence observed across regions.

In our study, the highest prevalence of constipation was noted in children aged 1–5 years. This aligns with data from van den Berg et al., who reported that constipation peaks during early childhood when children transition to toilet training and experience changes in diet or routine [14]. Additionally, the school-entry phase is often associated with stool withholding behavior due to reluctance to use school toilets or fear of pain during defecation [15].

Interestingly, the prevalence was slightly higher among boys than girls. Although Western literature often suggests a female predominance, several Indian studies, including that of Bansal et al., have shown a male preponderance [8]. This difference might be due to sociocultural factors affecting healthcare-seeking behavior or parental concern.

The most commonly reported symptoms in our cohort were painful or hard stools (12.1%) and withholding behavior (9.9%). These findings match previous Indian data where hard stool passage was among the top complaints in constipated children [8].

Stool form assessment using the m-BSFS revealed that types I and II were reported in 8.8% of children, and this group strongly overlapped with those identified using the IAP criteria. Lane et al. have shown that m-BSFS is a reliable and quick visual tool to support clinical assessment in pediatric constipation [14]. A substantial agreement ($\kappa = 0.77$, $p < 0.001$) was observed between the two tools, reinforcing the complementary role of symptom-based questionnaires and stool form charts in diagnosing constipation. This is especially useful in outpatient settings where detailed physical or invasive investigations are not always feasible.

It is noteworthy that no child with constipation had blood in stool, and such children were excluded to ensure that only cases of functional, not organic, constipation were studied. This step aligned with the IAP guidelines and ensured appropriate classification.

This study underscores the burden of functional constipation in Indian children and the value of culturally adapted, non-invasive screening tools. Larger, community-based studies are needed to validate these tools across diverse settings.

Conclusion

Functional constipation is a prevalent and under-recognized problem among Indian children, particularly in early childhood.

In our study, the prevalence was 10.6% by IAP consensus criteria and 8.8% by m-BSFS, with the highest rates seen in children aged 1–5 years. Male children were slightly more affected than females.

The most common symptoms included painful or hard stools and withholding behavior. A substantial agreement between the IAP questionnaire and m-BSFS ($\kappa = 0.77$) demonstrates the reliability of these tools for clinical use.

Adopting these simple, non-invasive diagnostic methods can enhance early identification, reduce healthcare costs, and improve the quality of life for affected children. Broader community-based studies and validation of these tools across diverse populations are recommended.

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