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Research Article

FUNCTIONAL CONSTIPATION IN CHILDREN: SOCIODEMOGRAPHIC AND RISK FACTORS ANALYSIS FROM A TERTIARY CARE TEACHING HOSPITAL OF NORTHERN INDIA

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ABSTRACT

Objectives: This study was done to evaluate demography and probable/potential risk factors for functional constipation (FC) in children.

Methods: This was a single-center and cross-sectional study; 100 patients ages ranging from early infancy to 17 years, who were suffering from FC defined by Rome IV criteria were recruited for 6 months. Data were gathered from individuals on sociodemographic characteristics, child's bowel habits, and psychosocial risk factors by their caregivers using a questionnaire. All patients were examined abdominally and rectally.

Results: Among the studied children 60% were females aged <2 years (54%). Most of the parents were illiterate belonging to urban areas (70%) having low (72%) socioeconomic status. Hard stools were the most common presenting complaint in 76% whereas vomiting was least common in 20% of the studied subjects. Abdominal distension was the most common finding on clinical examination in 42% of cases whereas fecal soiling was the least common only in 8%. Dietary habits were found one of the major probable risk factors. Living in the hostel or madrasa/religious residential institute was found to be a potential risk factor. Among psychological factors, history of fear of using a toilet was the most common type in 30% of cases.

Conclusion: Female gender, low fiber diet, positive family history of constipation, low socioeconomic status, and illiteracy of the mother were all risk factors of FC. Fear of using the toilet was the most common psychological insult.

Keywords: Constipation, Risk factors, Children.

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INTRODUCTION

Constipation is a worldwide problem among children and a frequent complaint encountered in pediatric medical and surgical practice, affecting up to 30% of children [1]. Constipation is a symptom, not a disease. Constipation has a significant impact on the cost of medical services [2,3]. It is defined as an abnormal stooling process which is referred to as either hard-to-pass stool or infrequent stooling (<3/week). Constipation in children is divided mainly into two types, functional constipation (FC) or organic. FC is seen in 95% of cases and is especially common among preschool-age children [4,5]. It is characterized by infrequent bowel movements, excessive straining, and hard stools. Unlike organic causes, FC is not due to an underlying biochemical or primary anatomical defects such as anorectal malformations, Hirschsprung disease, or neuromuscular defects [6] but rather stems from behavioral or functional factors. In 2016, Rome IV criteria were released to describe FC in children and require the presence of at least two out of six diagnostic criteria for at least 1 month with the provision of an absence of underlying organic etiology [6-8], that is, ≤2 defecations per week; history of painful bowel movements; history of retentive posturing; history of large-caliber bulky stools that can obstruct the toilet; the presence of a large fecal mass in the rectum; and ≥1 episode of fecal incontinence per week [9]. For infants and toddlers, modified criteria were to reflect age-appropriate toileting skills, that is, ≤2 defecations/week; history of painful bowel movements; history of excessive stool retention; history of large-caliber stools (in toilet-trained children, history of large diameter stools that can obstruct the toilet); the presence of a large fecal mass in the rectum; and ≥1 episode of fecal incontinence per week.

During infancy, the transition from breastfeeding to formula feeding or the introduction of solid foods is sometimes a trigger for the onset of FC [10]. Further, an association is suggested between cow's milk protein allergy and FC. An improvement has been described ranging from 28 to 78% after a cow's milk-free diet in young children with FC [11]. The latter is supported by evidence of histological changes in the mucosa of the colon indicating inflammation [11]. Even in young children, the disease negatively affects health-related quality of life and leads to considerable healthcare costs [2,3,12]. A well-known risk factor to develop FC in older children is psychological stress. Several studies have shown an association between family and school-related psychological stressors and constipation in older children [13]. Poor toilet training in the toddler period is another important risk factor for the development of constipation [14].

The fast-food industry is proliferating across the World and in India also. Recent studies have shown a higher prevalence of consumption of junk food and sugary drink in children [15,16]. Consumption of fast-food is a known predisposing factor for childhood constipation [17]. A diet low in fiber is also associated with childhood constipation [18,19].

However, there are less data from developing countries especially from Asia, on constipation in infancy and early childhood. Therefore, this study was undertaken with the objective of identifying risk factors for developing constipation in children in our setup.

METHODS

This was a single-center and cross-sectional study conducted in the Department of Pediatrics Government Medical College Doda,

Jammu and Kashmir, India, from October 19th, 2023, to April 18th, 2024. The cases involved children who were visiting the Outpatient Department (OPD) of the Pediatrics Government Medical College Doda with complaints of chronic constipation and the patients' age range was from early infancy to late adolescence. FC was diagnosed by questioning both parents and the patient using the Rome IV criteria. Those patients who were fulfilling Rome IV criteria for FC were included in the study.

Inclusion criteria

All infants and children from early infancy to late adolescence with a diagnosis of FC according to Rome IV criteria were included in the study.

Exclusion criteria

Any case with a medical or surgical cause of constipation (organic constipation), for example, drugs, congenital hypothyroidism, Hirschsprung disease, recto-anal malformations, spinal cord lesions, etc., and those who refuse to participate in the study were excluded from the study.

Children having severe neurological or mental disorders were also excluded from the study.

A structured questionnaire was used to collect data regarding demographic characteristics and probable/potential underlying risk factors of constipation. Data regarding constipation parameters, physical or psychological disorders, personal (school phobia/temper tantrum) and family stressors (parental disharmony, sibling rivalry, and death of family members), and the food habits of the child were also collected. Each case was fully examined by a well-trained pediatrician and surgeon to tackle the cause of constipation. Over 6 months, the total number of patients collected with chronic constipation was 79 patients. Only 50 patients were included in the study because they met the inclusion criteria. Using a questionnaire, data were gathered from patients and their caregivers including sociodemographic characteristics, onset and duration of constipation, and type of feeding during early infancy and were examined for abdominal and rectal findings. All findings during the physical examination were recorded. A midstream clean catch urine sample from each patient was sent for general urine examination.

Ethical issues

Ethical approval was obtained from the Medical Research Ethics Committee, Government Medical College, Doda (Ref. No. 08/IEC/GMCD/2023 dated October 18, 2023). Written informed consent was obtained from the parents of all subjects involved in the study.

Statistical analysis

Data were processed using SPSS 23.0 software. Appropriate tests of significance were applied to find out the significance of the results.

RESULTS AND DISCUSSION

Most of the studied children were female (60%), aged <2 years (54%). Most of the parents were illiterate belonging to urban areas (70%) having low (72%) socioeconomic status. About 20% had a family history of constipation and psychological insult (Table 1).

Hard stools were the presenting complaint in 76% of subjects, other complaints were colic in 66%, anorexia in 62%, abdominal pain in 48%, anorexia in 24%, blood in stool in 24%, and vomiting in 20% of studied subjects (Table 2). In retentive posturing, the child is trying to withhold his stool voluntarily by standing or crossed legs. Sometimes they might have sweating all over their face on straining or they may hide in a corner to postpone defecation.

Findings on clinical examination and their frequencies in FC patients are shown in Table 3. Abdominal distension was the most common in 42% of cases whereas fecal soiling was the least common only in 8% of the studied population.

Table 1: Sociodemographic characteristics of cases and controls

Demographic characteristics	Number (%)
Gender	
Male	20 (40)
Female	30 (60)
Age groups (years)	
<2	27 (54)
2–5	14 (28)
>5	9 (18)
Mother's age (years)	
≤19	3 (6)
>19	47 (94)
Mother's educational level	
Illiterate/primary school	22 (44)
Intermediate-secondary	4 (8)
High School	6 (12)
University post-graduate	18 (36)
Mother's job status	
Housewife	25 (50)
Employees in the health sector	9 (18)
Employees in other sectors	16 (32)
Paternal educational level	
Illiterate/primary school	5 (10)
Intermediate-secondary	5 (10)
High School	30 (60)
University postgraduate	10 (20)
Living area	
Urban	35 (70)
Rural	15 (30)
Psychological insult	
Yes	10 (20)
No	40 (80)
Family history	
Yes	10 (20)
No	40 (80)
Socioeconomic status	
Low	36 (72)
Medium	8 (16)
High	6 (12)

Table 2: Presenting complaints of study subjects (n=179)

Presenting complaints	Number (%)
Hard stools	38 (76)
Colic	33 (66)
Anorexia	31 (62)
Abdominal pain	24 (48)
Anorexia	12 (24)
History of streaks of blood on the stool	12 (24)
Vomiting	10 (20)

Table 4 highlights precipitating factors among children with FC. Dietary habits found to be one of the major probable risk factors among the subjects. A low fiber diet was found in 70% of children with constipation, among other probable causes, diminished fluid intake in 30%, ingestion of cow's milk in 58%, not having regular meals with parents in 36%, and consumption of junk foods was found in 60% cases.

Psychological factors play an important role too. Staying with grandparents (14%), psychological stress (20%), and living in a hostel or madrasa/religious residential institute (24%) found to be potential associated factors in this study. Less physical activity found in 6% and child obesity in 4% of subjects. Among academic factors, busy with tutor and coaching in 6%, unhygienic toilet of school in 10% cases of children with constipation. We found constipation in 4% of children in the low-income group and in 10% where the mother was a service holder.

Table 5 illustrates the types of psychological insults and their order of frequency among those children, a history of fear of using a toilet the

most common type in 30% of cases followed by fear of going to school was seen in 20% of children.

FC is a common problem among pediatric age group all over the world. In our study, females were more affected by FC than males similar to Chan [20] and Kajiwara *et al*. [21] whereas Ganinkou *et al*. [22] and Khanna *et al*. [23] found a male preponderance. In other studies, there was no gender association [24,25]. FC was common in children <2 years old consistent with Kondapalli *et al.* [26], where 57% of children had constipation in the age group of 2–4 years. This difference may be due to the changing pattern of toilet training, attention differences among caregivers, and differences in regional food habits. On the other hand, considering the association between maternal educational/socioeconomic status and FC in children, constipation seems to be a more prevalent problem in families with lower education and low-income communities like people living in slum areas [27-29]. The difference may result from diet habits (high rice/carbohydrate), environmental, cultural, racial reasons, or how to deal with the constipated child thereby delaying any medical advice in this situation. This was also concluded by Rezaianzadeh *et al*. [30], in addition, stressful life events affect gut function. A study by Johanson [31] in the United States confirmed this relationship. Most of the children in our study belong to urban areas consistent with a study by Rajindrajith *et al*. [32] where children living in urban areas were at higher risk of constipation, whereas Chu *et al*. concluded that children residing in rural areas were at higher the risk of constipation [32,33]. The conflict between different papers needs to be studied further to reach an appropriate conclusion. In our study, there was no family history of FC in children. This was in contrast with studies by Olaru *et al*. [34] and Rezaianzadeh *et al*. [30].

Table 3: Findings on clinical examination in study children with functional constipation

Clinical finding	n (%)
Abdominal distension	
Yes	21 (42)
No	29 (58)
Fecal abdominal mass palpable	
Yes	10 (20)
No	40 (80)
Anal fissure present	
Yes	05 (10)
No	45 (90)
Anal skin tags present	
Yes	6 (12)
No	44 (88)
Large rectal fecal mass palpable	
Yes	05 (10)
No	45 (90)
Fecal soiling	
Yes	4 (8)
No	46 (82)

Table 4: Precipitating factors among children with functional constipation

Probable risk factors	Number (%)
Dietary factors	
Diet low in fibers	35 (70)
Diminished fluid intake	15 (30)
Cow's milk intake	29 (58)
Not having regular meals with parents	18 (36)
Consumption of junk food	30 (60)
Psychological factors	
Psychological stress	10 (20)
Stays with grandparents	7 (14)
Lives in a hostel or madrasa	12 (24)
Maidservant caregiver	1 (2)
Less physical activity (no exercise/sports)	3 (6)
Obese child	2 (4)
Busy with tutors/coaching class	3 (6)
Unhygienic toilet in school	5 (10)
Low-income family	2 (4)
Working/service holder mother	5 (10)

Table 5: Types of psychological insults

Type of psychological insult	Number (%)
Fear of using the toilet	3 (30)
Fear of going to school	2 (20)
Abuse either verbal or physical	1 (10)
Quarrels in the family	1 (10)
New family member	1 (10)
Single parent	1 (10)
Any death within the family	1 (10)
Sexual abuse	0 (0)
Total number of patients	10

To illustrate the main symptoms of constipation, our data revealed that constipation in infants and children is described as passage of hard stool in most cases which were the main complaint in our study in 76% of cases consistent with a study carried out by Dehghani *et al*. [35], where 60% of them had hard stool consistency and painful defecation and one-third of the cases had a large stool, painful defecation, and retentive posturing. Chang *et al*., reported that 68% of their cases had a history of a large fecal mass in the lower abdomen, a history of retentive posture, weekly soiling, and stool frequency 2 times or less per week [36]. In another study carried out in Korea, painful defecation and hard stool were reported in 55.6% of cases, retentive posture was reported in 50% of the cases while 44.4% of them reported a stool frequency 2 times or less per week, and a history of large fecal mass in the rectum, 38.9% had a history of large stool that obstruct the toilet and 27.8% reported soiling once per week or more [37].

Regarding outcomes of FC, the present study revealed that abdominal pain was reported by 48% of children with FC. In a study from Iran [35], abdominal pain was reported by 41.4% of children with FC which is in line with our study, but Sujatha *et al*. reported a lower frequency of abdominal pain among children with FC (29.7%) [38]. Kondapalli and Gullapalli [26], in their study, observed, 30.6% of children with constipation presented with recurrent abdominal pain, The causes of abdominal pain may be due to fecal and gaseous loading of the gut.

We found anorexia in 24% of cases and vomiting in 20% of cases as one of the presenting complaints in consistent with a study by Dehghani *et al*. [35] and Jeong *et al*. [39]. Conversely, anorexia leads to low food intake that reduces defecation frequency. Hence, anorexia and FC both interact in a vicious cycle. In our study, an anal fissure was observed among 10% of cases in line with studies by Dehghani *et al*. [35] and Aydoğdu *et al*. [40]. Early detection and treatment of anal fissures accelerate the recovery of chronic constipation.

Our data found that their usual diet was fiber-poor and a high percentage of them were consuming mainly carbohydrates with little or no fruits or vegetables in their meals. Olaru *et al*. [34], Rezaianzadeh *et al*. [30], and Yang *et al*. [41] concluded through a meta-analysis study that fiber rich diet helps in increasing defecation frequency in constipated patients. The previous studies have shown that lower consumption of vegetables and fruits causes FC [42,43]. One of the most important causes of chronic constipation in children is insufficient dietary fiber intake [42-44].

In our study, 14% of children with constipation were staying with grandparents, 24% of children residing in the hostel or madrasa/religious residential school, and 5% had working/service holder mother. Moreover, children who are exposed to stressful life events and psychological trauma such as punishment, bullying, domestic

violence, death of a family member, or any stressful new life events or abuse are more prone to FC as reported in this study. Psychological stress adversely affects bowel function and increases pelvic floor tension. Few studies have reported abnormalities in rectal blood flow and changes in rectal sensitivity in some patients with psychological trauma. Rajindrajith *et al*. [32] concluded that the association between stress and constipation is explained by the disturbance of the brain-gut axis [45-49]. Other studies have shown that increased levels of psychological stress are associated with constipation [50].

In the present study, we also found parent's anxiety/complaints about academic factors like a long time coaching/tuition classes (6%) that pose a negative impact on regular bowel movement or associated with the voluntary holding of defecation urge which is associated with fecal impaction and constipation. In a study performed by De Schryver *et al*. [51], regular sports/physical activity was found to be a protective factor against constipation in adults. This is based on the knowledge that slow gastrointestinal transit time is associated with constipation, and it is assumed that exercise shortens transit time through the gastrointestinal tract [51]. On the other hand, other authors have put forward no relationship between physical exercise and constipation in adults [52]. Unfortunately, there are limited data in the scientific literature about the effects of physical activity on constipation in children. It was assessed that one of the major contributing factors to childhood constipation with disabilities is physical immobility [53]. According to our data, constipation was found in 6% of children who had less physical activity and 4% of children who were obese.

In this study, we found that 10% of children refused to defecate at school. The cause of refusal may be the issue of the poor toilet environment and this is impacting more on the constipated child. According to a study performed by Lundblad and Hellström [54], many children influenced by negative perceptions of school toilets have adopted unhealthy toilet habits during school time based on their physical appearance leading to feelings of insecurity when visiting the toilet. For most of the children, a toilet visit away from home can create a psychological strain. Vernon *et al*. [55] also reported that the avoidance of school toilets has negative consequences for children, such as a higher risk of developing constipation, incontinence, and/or urinary tract infections. Our findings are also parallel to these ideas.

This is the first study in our locality. This single-center study with a small sample size and, the absence of a control group was the main limitation of our study. Information obtained from caretakers other than parents may not reflect the correct picture. Another important limitation of the study was time limitation and its cross-sectional design which proves only association and not causality between FC and related factors. Furthermore, the inclusion of cases were from only one district and within a specific age group might limit the generalizability of results over all children in the Jammu and Kashmir region (India). However, among the strengths of the present study is the fact that all cases of FC were identified by valid Rome IV criteria. Furthermore, children were symptomatic as they came to the well-baby clinic for routine checkups or vaccination which limits selection bias. A multicenter study and a larger sample size are recommended in the future.

CONCLUSION

FC was found higher in female, above 2-year-aged children. Low dietary fiber, consumption of cow's milk, not taking adequate fruits or vegetables, unwillingness to use toilets in school, and busy academic schedules were found to be probably related to FC. A more aggressive treatment approach for constipation may be used in these patients. In the cases that associate, severe behavioral disorders, early diagnosis, and a multidisciplinary therapeutic approach can be useful for both the child and families.

RECOMMENDATIONS

Based on the results and discussion of this study, the following recommendations are made:

1. Raising awareness of parents regarding symptoms and risk factors of FC among their children; with emphasis on the importance of early recognition and management.
2. Educating mothers about the importance of breastfeeding and daily fruit intake for their children to prevent FC.
3. Better evaluation of the problems among children in Jammu and Kashmir (India) through conducting a multi-centric study including children with different presentations and risk factors.
4. Future studies will be needed with larger samples to confirm this study's findings on prevalence and the association of a mother's age with having a child with FC.
5. Longitudinal studies are also recommended to determine the actual causation rather than the association between FC and possible risk factors.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest in relation to this study, as well as the published research results, including the financial aspects of conducting this research, obtaining and using its results, as well as any non-financial personal relationships.

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