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Effectiveness of management program of chronic functional constipation in children who are attending the Pediatric Gastroenterology Clinic at Elbeheira Specialized Children's Hospital

Hamouda E. El-Gazzar
Department of Pediatrrics, Damanhour Medical National Institute, EL-Beheira, Egypt.,
Dr_hamouda2008@yahoo.com

Sabreen Ahmed Ali Elsaka
Health Quality Department, EL-Beheira Health Directorate, M.O.H.P, Egypt.

Eman Adel Elsaid Elhaddad
Department Elbeheira Specialized Children's Hospital, EL-Beheira Health Directorate, M.O.H.P, Egypt.

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ORIGINAL STUDY

Effectiveness of management program of chronic functional constipation in children who are attending the pediatric gastroenterology clinic at Elbeheira Specialized Children's Hospital

Hamouda E. El-Gazzar [a,*], Sabreen A. Ali Elsaka [b], Eman A.E. Elhaddad [c]

[a] Department of Pediatrics, Damanhour Medical National Institute, EL-Beheira, Egypt
[b] Health Quality Department, EL-Beheira Health Directorate, M.O.H.P, Egypt
[c] Elbeheira Specialized Children's Hospital, EL-Beheira Health Directorate, M.O.H.P, Egypt

Abstract

Background: **A chronic constipation is one of the most common functional gastrointestinal (GI) complaints in pediatric outpatient clinics. The prevalence of childhood constipation in the general population ranges widely from 0.7 to 29.6% internationally. Pediatric Gastroenterology Clinic at Elbeheira Specialized Children's Hospital is a referral center from the whole governorate.**

Objectives: **To evaluate the current approach to management, risk factors associated, and clinical characteristics, the challenge of functional constipation (FC) in the pediatrics who are attending the Pediatric Gastroenterology Clinic at Elbeheira Specialized Children's Hospital.**

Methods: **This retrospective study was conducted in Pediatric Gastroenterology Clinic at Elbeheira Children's Specialized Hospital for 6 months (from October 2022 to April 2023). All children from 1 month to 15 years of age came to the pediatric GIT clinic complaining of FC as defined in Rome IV criteria were included. Children with evidence of organic cause of constipation were excluded. Google form sheet developed by the researcher to collect the demographic data. Detailed history and examination were performed. Laboratory investigations were when indicated to confirm fecal impaction and to exclude any underlying organic cause. The plan of management included pharmacological treatment (Laxatives), Toilet desensitization, rewards, and counseling.**

Results: **In our study, 46.7% of the patients were in the school-age, 48% were females, two-thirds lived in rural areas, and 70% of their caregivers were educated. The median age at the onset of constipation in most of them was 12 months 29 children (19.3%) suffered from associated diseases. The median duration of prereferral treatment was 10.5 months, mainly including osmotic laxatives (27.3%) and oral stimulants (11.3%). The main triggering factors for FC were toilet training (39.3%), urge postponing at school (32%), and weaning practices (24.7%). The main complaints were abdominal pain (60%), delayed passage of stool (53.3%), and hard stool (38%). Physical findings before treatment revealed abdominal distention (76%), palpable fecal mass (46%), rectal mass (8.7%), and anal fissure (5.3%). After treatment, the majority of caregivers (96%) were significantly educated on non-pharmacological management. The majority of children received osmotic laxatives (98.7%), stimulants (89.3%), and softeners (74%). The main challenges were compliance with treatment (51.3%), unclear medical history (16.7%), withholding behavior (14.7%), and previous investigations (8%). Positive response to treatment was reported in 141 children (94%) which was not affected by either sociodemographic characteristics, presence of associated diseases, age at onset of constipation, anthropometric measurements, or relevant and prereferral history ($P > 0.05$). The mean duration of fecal dis-impaction was 5.28 $\pm$ 2.06 days, and the regular bowel movement was restored after a mean duration of 32.4 $\pm$ 14.6 days. After treatment, all symptoms and physical findings showed significant improvements ($P < 0.05$) pistol score showed significant dramatic improvement after treatment ($P < 0.001$).**

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* Corresponding author. Department of Pediatrrics, Damanhour Medical National Institute, EL-Beheira, Egypt.
E-mail address: Dr_hamouda2008@yahoo.com (H.E. El-Gazzar).

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Conclusion: **The management program for chronic FC in children in the Pediatric Gastroenterology Clinic at Elbeheira Specialized Children's Hospital is effective with significant improvement and positive responses in the majority of patients.**

Keywords: Functional constipation, Incontinence, Colic. pediatric gastroenterology

1. Introduction

Constipation is among the most prevalent gastrointestinal (GI) symptoms that can lead to lots of complications if left untreated [1]. Constipation comprises 3–5% of inpatient referrals to pediatric physicians and specialists as well as 25% of cases referring to pediatric gastroenterology clinics [2]. This disorder does not usually have any structural, endocrine, or metabolic causes and is therefore identified as idiopathic or functional constipation (FC) It is defined by the North American Society of Gastroenterology and Nutrition as a delay or difficulty in defecation, present for 2 weeks or more, and sufficient to cause significant distress to the patient [3]. The term FC describes all children in whom constipation does not have an organic etiology [4].

Some studies have indicated that 90–95% of cases suffer from FC and only 5–10% of children have organic factors [5]. It is also a major problem for patients and their families and imposes a great burden on the society [6] According to some studies, 16% of parents reported constipation in their 22-month-old children [7,8]. The multifactorial pathophysiology of constipation has been accepted by researchers. Accordingly, constipation occurred due to various factors, including low consumption of fiber, positive family history, and socioeconomic status [9].

In Egypt, the awareness about childhood FC is low and the magnitude of this problem is underestimated. Although not enough epidemiological data are available, we believe that Constipation is very common in our society.

2. Methods

This retrospective study was conducted in Pediatric Gastroenterology Clinic at Elbeheira Children's Specialized Hospital for 6 months (from October 2022 to April 2023). A total of 150 children came to the pediatric GIT clinic complaining of FC as defined in Rome IV criteria were included.

2.1. Inclusion criteria

Children from 1 month to 15 years of age complaining from FC as defined in Rome criteria.

2.1.1. Case classification

(1) It must include one month of at least two of the following in an infant up to four years of age:
   (a) Two or fewer defecations/week.
   (b) History of excessive stool retention.
   (c) History of painful or hard bowel movements.
   (d) History of large-diameter stools.
   (e) Presence of large fecal mass in the rectum.
(2) Must include one month of at least two of the following in a child 4 years of age or older and in toilet-trained children:
   (a) At least one episode per week of fecal incontinence after the acquisition of toilet skills.
   (b) History of large-diameter stools that may obstruct the toilet.

2.2. Exclusion criteria

(1) Children with evidence of organic cause of constipation.
(2) Refusal of participating by patient or caregiver.

The following was done for all cases:

(1) Google form sheet developed by the researcher developed from patient medical records to collect the demographic data: age, sex, social status, and maternal level of education.
(2) History: Clinical history included the precipitating factors, the onset, duration, and nature of the presenting complaints such as abdominal pain, nausea, bloating, anorexia, and/or rectal bleeding. Stooling patterns were also reported in detail including the frequency of bowel motions, and stool type according to the Bristol stool form scale. History of the passage of lumpy or painful stool, stool withholding behaviors, fecal incontinence, and the use of manual maneuvers to help defecation. Data were collected about any associated urinary complaints including day or bedtime wetting, urgency, dysuria, infrequent micturition, or recurrent urinary tract infections.
(3) Examination
   (a) Anthropometric parameters: weight in kg, height in cm, body mass index, body surface area.

(b) Abdominal examination presents palpable fecal mass and abdominal distention.
(c) Rectal digital examination.

(4) Investigation:
(a) Laboratory investigations were done only if there is no adequate response to the laxatives in order to exclude any underlying organic cause for the constipation as indicated. These investigations included free T4, TSH, electrolytes, and screening for celiac disease.
(b) A plain radiography was performed to document the presence of fecal impaction only if the clinical presentation is very suspicious of functional constipation, but the examination is not conclusive or refused.

(5) Plan of management
(a) Pharmacological treatment: Laxatives (Fecal dis-impaction and maintenance)
(b) Toilet desensitization (Encourage toilet after each meal, rewards)
(c) Counseling about diet habits and the importance of long-term laxative use.

2.3. Ethical considerations

(1) Approval of Local Ethical Committee at Ministry of Health, Egypt.
(2) Official permission from the hospital administrator of the identified setting will be obtained to collect the necessary data from medical records.
(3) All the obtained data are confidential, and the patients have the right to keep them.
(4) The authors declare that there is no financial conflict regarding the research and publication.
(5) No conflict of interest regarding.
(6) Statistical analysis.
(7) Data were obtained and analyzed using an appropriate statistical technique to determine the effect of the management program in the management of functional chronic constipation.

3. Results

Table 1 shows that 46.7% of the patients were of school age, 48.0% were females, two-thirds lived in rural areas, and 70% of their caregivers were educated. Their median weight and height were on 50 percentiles. The median age at the onset of constipation was 12 months which ranged from birth to 10 years and in 19 cases (12.7%) the age of onset of constipation couldn't be identified. Twenty-nine children (19.3%) suffered from associated diseases including GERD (10 cases), CMPA (8 cases), cyclic vomiting syndrome (5 cases), CP, and obesity (one case each).

In Table 2, about one-third of children (37.3%) had a family history of constipation. During infancy, 28.7% were on breastfeeding and 36.7% were on mixed breast and formula feeding. Before referral to our hospital, about 62.7% sought medical care for their main complaints, 41.3% were diagnosed with

Table 1. General characteristics of the study participants.

Variables	$n = 150$ (%)
Age	
Infant	28 (18.7)
Toddler	52 (34.7)
School-age	70 (46.7)
Sex	
Male	78 (52.0)
Female	72 (48.0)
Residence	
Rural	100 (66.7)
Urban	50 (33.3)
Level of education of the caregiver	
Illiterate	45 (30.0)
Educated	105 (70.0)
Weight percentile	
Mean ± SD	45.4 ± 13.9
Median [IQR]	50 [40–50]
Min – Max	3–70
Height percentile	
Mean ± SD	47.2 ± 12.3
Median [IQR]	50 [50]
Min – Max	3–75
Age at the onset of constipation [a] (months)	
Mean ± SD	26.3 ± 26.6
Median [IQR]	12 [6–36]
Min – Max	Since birth – 120
Associated diseases (Yes)	29 (19.3)

IQR, Inter-quartile range.
[a] The age of onset of constipation couldn't be identified in 19 cases (12.7%).

Table 2. History and prereferral characteristics of the study participants.

Variables	$n = 150$ (%)
Family history of constipation (Yes)	101 (67.3)
Feeding history during infancy	
Breast milk	43 (28.7)
Milk formula	52 (34.7)
Mixed feeding	55 (36.7)
Prereferral seeking medical care for main complaint (Yes)	94 (62.7)
Pre-referral diagnosis of constipation (Yes)	62 (41.3)
Prereferral family education[a]	
adequate fiber diet	35 (23.3)
and fluid intake	19 (12.7)
No	115 (76.7)
Pre-referral duration of treatment of patient symptoms (months)	
Mean ± SD	12.5 ± 10.1
Median [IQR]	10.5 [6–12]
Min – Max	1–48
Pre-referral pharmacological treatment[a]	
Osmotic laxatives	41 (27.3)
Oral stimulant	17 (11.3)
Suppository softener	7 (4.7)
Not prescribed	90 (60.0)

IQR, Inter-quartile range.
[a] Includes more than one choice.

functional constipation, 23.3% and 12.7% of their families were educated on diet regimen with adequate fiber and water intake respectively while 60% didn't receive any pharmacological treatment. The median duration of prereferral treatment of patient symptoms was 10.5 months which ranged from 1 month to 4 years that mainly included osmotic laxatives (27.3%) and oral stimulants (11.3%).

Table 3 shows that among the triggering factors for FC, 39.3% were related to toilet training, 32% were due to a difficult situation at school (urge postponing) and 24.7% were related to weaning practices. The main complaints were abdominal pain (60%), delayed passage of stool (53.3%), and hard stool (38%) while among the associated symptoms were urinary problems (42%) mainly bedtime wetting, and recurrent UTI, poor appetite (40.7%), bleeding per rectum (16.7%), and stool incontinence (16%). Physical findings before treatment revealed abdominal distention (76%), palpable fecal mass (46%), PR rectal mass (8.7%), and anal fissure (5.3%). Detailed prereferral laboratory and radiological investigations are described in this table (Table 4).

Table 4 shows that after treatment, the majority of caregivers (96%) were significantly educated on non-pharmacological management that is suitable for the condition of their adequate fiber diet and fluid intake (93.3%), behavioral modification (92%), physical activity (39.3%) Childhood constipation is a common healthcare problem worldwide. The diagnosis is based on the history and a physical examination, in accordance with the Rome III criteria. Additional investigations are required only in situations in which the diagnosis is not clear, and in order to rule out an underlying disease. Non-pharmacological management involves education, demystification, a toilet program with a reward system, and a daily bowel diary. Pharmacological treatment with laxatives consists of the Management of FC in Children: Therapy in Practice disimpaction, maintenance treatment, and eventually weaning off medication. Maintenance treatment should be continued for at least 2 months, and FC symptoms should be resolved for at least 1 month before a gradual reduction of the medication. The long-term prognosis is moderate even if early adequate therapeutic. The main challenges encountered by the management were compliance with treatment (51.3%), unclear medical history (16.7%), and withholding behavior (14.7%), previous investigations (8%).

Table 3. Clinical, laboratory, and radiological characteristics of the study participants.

Variables	$n = 150$ (%)
Triggering factors[a]	
Toilet training	59 (39.3)
Difficult situation (school)	48 (32.0)
Weaning	37 (24.7)
Others[b]	3 (2.0)
Not identified	22 (14.7)
Main complaints[a]	
Abdominal pain	90 (60.0)
Delayed passage of stool	80 (53.3)
Hard stool	57 (38.0)
Passage of lumpy painful stool	25 (16.7)
Stool incontinence	10 (6.7)
Overflow diarrhea	6 (4.0)
Vomiting	1 (0.7)
Associated symptoms[a]	
Urinary problems[c]	63 (42.0)
Poor appetite	61 (40.7)
Abdominal pain	31 (20.7)
Bleeding per rectum	25 (16.7)
Stool incontinence	24 (16.0)
Nausea	23 (15.3)
Vomiting	23 (15.3)
Poor weight gain	18 (12.0)
Physical findings before treatment[a]	
Abdominal distension	114 (76.0)
Palpable fecal mass	69 (46.0)
PR rectal mass	13 (8.7)
Anal fissure	8 (5.3)
Skin tags	1 (0.7)
Previous Laboratory investigations (Yes)	88 (58.7)
Prereferral Laboratory Investigation[a]	
FMF	35 (23.3)
Electrolytes	22 (14.7)
Free T4, TSH	20 (13.3)
Screening for celiac disease	20 (13.3)
Stool analysis	13 (8.7)
Stool culture	7 (4.7)
Fecal calprotectin	4 (2.7)
H pylori Ag in stool	4 (2.7)
Bleeding profile	3 (2.0)
Urine analysis	3 (2.0)
Stool pH	2 (1.3)
Eliminate cow milk products	2 (1.3)
CBC, CRP	1 (0.7)
Not done	61 (40.7)
Abdominal radiography	
Abdominal sonography	48 (32.0)
Plain radiography abdomen	32 (21.3)
Barium enema	16 (10.7)
Ct Abdomen	10 (6.7)
Endoscopy	3 (2.0)
Not done	41 (27.3)

[a] Includes more than one choice.
[b] Include: changing home, at a young age, and CP (one case each).
[c] Include bedtime wetting (33 cases), recurrent UTI (28 cases), dysuria (10 cases), and urgency (8 cases) with some cases having more than one condition.

Table 4. Management of functional constipation among the study participants.

Variables	$n = 150$ (%)
Nonpharmacological management[a]	
Adequate fiber diet and fluid intake	140 (93.3)
Behavioral modification	138 (92.0)
Physical activity	59 (39.3)
No	6 (4.0)
Management challenges[b]	
Compliance to treatment	77 (51.3)
Unclear medical history	25 (16.7)
Withholding behavior	22 (14.7)
Previous investigations	12 (8)

[a] Includes more than one choice.
[b] Includes poor response to treatment that needed evacuation several times.

In Fig. 1, the final results showed a positive response to treatment in 141 children (94%) and a poor response in only 9 children (6%).

In Table 5, the mean duration of fecal dis-impaction was 5.28 ±2.06 days and the regular bowel movement was restored after a mean duration of 32.4±14.6 days that ranged from 18 − 58 days. After treatment, the majority of caregivers (96%) were significantly educated on non-pharmacological management that is suitable for the condition of their children. All physical findings showed significant improvements ($P < 0.05$) after treatment including lax abdomen in 112 out of 114 cases (98.2%), no palpable fecal mass in 67 out of 69 cases (97.1%), PR not repeated in 10 out of 13 cases (76.9%), and anal fissure was healed in all of the 8 cases (100%). Both abdominal pain and urinary complaints showed significant improvement after treatment ($P < 0.001$) among 95.3% of children.

Bristol score showed significant dramatic improvement after treatment ($P < 0.001$) where all children with type 1 (32%), type 2 (54%) changed to type 3 (15.3%) type 4 (50.7%), type 5 (16.7%), type 6 (10.7%), and type 7 (6.7%) (Fig. 2).

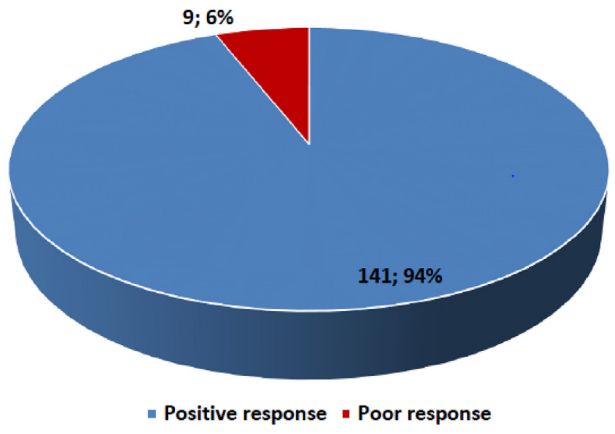

Fig. 1. Final results after treatment of children with functional constipation.

Table 5. Comparing different clinical parameters and management before and after treatment.

Variables	Before treatment $n = 150$ (%)	After treatment $n = 150$ (%)	*P*-value
Family education on non-pharmacological treatment			
Yes	35 (23.3)	144 (96.0)	<0.001[b]
No	115 (76.6)	6 (4.0)	
Physical findings[a]			
Abdominal distension	114 (76.0)	2 (1.3)	<0.001[b]
Palpable fecal mass	69 (46.0)	2 (1.3)	<0.001[b]
PR rectal mass	13 (8.7)	3 (2.0)	0.018[b]
Anal fissure	8 (5.3)	0 (0.0)	0.007[b]
Abdominal pain			
Present	121 (80.7)	7 (4.7)	<0.001[b]
Absent	29 (19.3)	143 (95.3)	
Associated urinary complaints			
Present	63 (42.0)	7 (4.7)	<0.001[b]
Absent	87 (58.0)	143 (95.3)	

Values are presented as numbers and percentages and analyzed by Fisher's exact test.
[a] Includes more than one choice.
[b] Significant.

Values present as mean ± SD and median [IQR] and analyzed by independent samples-*t* test or Mann−Whitney test.

Table 6 shows that positive response to treatment was not affected by either sociodemographic characteristics, presence of associated diseases, age at onset of constipation, anthropometric measurements, or relevant and pre-referral history ($P > 0.05$).

4. Discussion

FC is a common pediatric healthcare problem worldwide, with a reported prevalence ranging between 0.7 and 29.6% Mugie and colleagues [10]. Constipation can result in missed school days, repeated doctor visits, exclusion from social activities, and shame, particularly if the patient has pseudo-incontinence [11,12]. In the current study, The mean age of the constipated children was 12 months which is lower compared with the study by Chang and colleagues [13].

Most of our patients had moms with low to intermediate levels of education and were of low to moderate socioeconomic positions. This was in line with data from several studies Van Den Berg and colleagues [14].

Since voluntary fecal retention is the primary cause of constipation in children, environmental factors that may delay defecation may have an impact on how frequently children experience constipation Tam and colleagues [15].

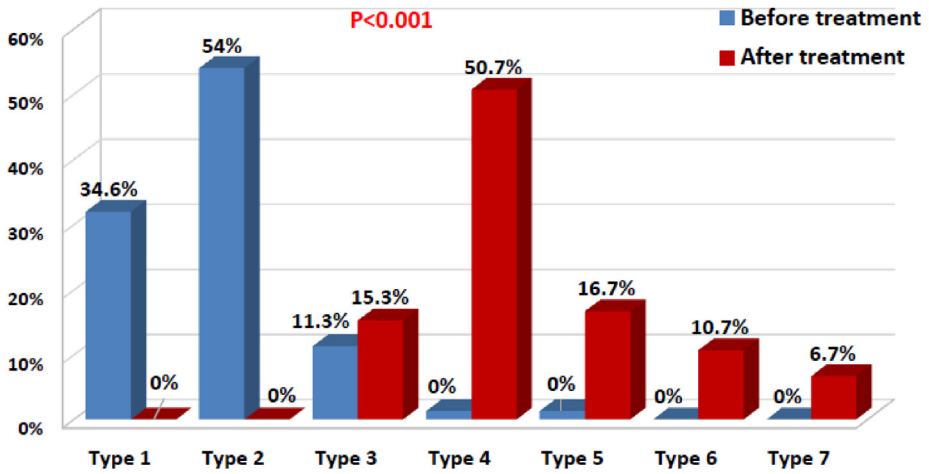

Fig. 2. Comparison between Bristol Score before and after Treatment.

In the present study, among the triggering factors for FC, 39.3% were related to toilet training, and 32% were due to a difficult situation at school. Our kids described the absence of clean public restrooms and shyness as the causes of urge delaying in public settings, particularly schools. Similar findings were made by Kocaay *and colleagues* [16] and Felt and colleagues [17] who discovered that many school-children do not use the restrooms at their schools to pee and that this was substantially more common in constipated children than in non-constipated children.

Children in some families may be predisposed to developing constipation. In one longitudinal study, a family history of constipation was observed in more than one-half of children with chronic constipation and soiling seen over a seven-year period. The reasons for this familial tendency are not clear and may include shared genetic, environmental, and/or dietary Ostwani and colleagues [18].

The familial tendency for constipation, which was noted in 37.3% of patients, was another likely cause of constipation in our patients. This was in line with the findings of Ostwani and colleagues [18] who discovered that relatives of constipated children are more likely to experience constipation themselves. This familial propensity is most likely brought on by a combination of genetic, environmental, and nutritional factors.

Complaints of FC range from infrequent bowel evacuation, hard small feces, difficult or painful evacuation of large-diameter stools, and fecal incontinence Van Tilburg and colleagues [19].

Hard stool consistency was found in about 38% of cases. Chang and colleagues [13] reported that 60% of their cases had hard stool consistency which was higher than our study. Painful defecation was noted among 16.7% of all.

Abdominal pain was present in 80% of our patients. Abdominal pain is often associated with FC

Table 6. Relation between final prognosis and different study variables.

Variables	Positive response $n = 141$ (%)	Poor response $n = 9$ (%)	*P*-value
Age			
Infant	28 (19.9)	0 (0.0)	0.083
Toddler	46 (32.6)	6 (66.7)	
School-age	67 (47.5)	3 (33.3)	
Sex			
Male	73 (51.8)	5 (55.6)	1.000
Female	68 (48.2)	4 (44.4)	
Residence			
Rural	93 (66.0)	7 (77.8)	0.718
Urban	48 (34.0)	2 (22.2)	
Level of education of the caregiver			
Illiterate	41 (29.1)	4 (44.4)	0.453
Educated	100 (70.9)	5 (55.6)	
Associated diseases	28 (19.9)	1 (11.1)	1.000
Age at onset of constipation (months)			
Median [IQR]	12 [6–36]	12 [6–36]	0.838
Weight percentile			
Mean ± SD	45.4 ± 14.3	45.6 ± 5.3	0.974
Height percentile			
Mean ± SD	47.0 ± 12.7	50.0 ± 0.0	0.485
Family history of constipation	94 (66.7)	7 (77.8)	0.719
Feeding history during infancy			
Breast milk	40 (28.4)	3 (33.3)	0.948
Milk formula	49 (34.8)	3 (33.3)	
Mixed feeding	52 (36.9)	3 (33.3)	
Prereferral seeking medical care	87 (61.7)	7 (77.8)	0.485
Prereferral diagnosis of constipation	57 (40.4)	5 (55.6)	0.489

IQR, Inter-quartile range.
Values are present as numbers and percent and analyzed by Chi-square or Fisher exact tests.

but is not among the diagnostic criteria. About 90 percent of children presenting with recurrent abdominal pain have a functional etiology such as constipation or irritable bowel syndrome Van Tilburg and colleagues [19].

Another frequent presenting symptom, seen in 16% of our cases, was fecal incontinence. Fecal incontinence is now included among the diagnostic criteria for functional constipation. This is because 80 percent of children with fecal incontinence have underlying constipation. Between 16 and 90% of children with constipation experience stool incontinence, according to several authors' reports Kocaay and colleagues, Raghunath and colleagues [16,20]. Caretakers may occasionally mistake it for diarrhea and seek medical treatment for chronic diarrhea, which makes the diagnosis more difficult. In 16.7% of our patients, bleeding per rectum was noted, and for carers, this symptom was the most concerning. The longer duration of constipation in the examined youngsters can be related to this increased prevalence.

Anorexia was noted in about 15.38% of cases in our study which was slightly higher than Benninga and colleagues study which reported anorexia in 10% of cases [21].

Anorectal and lower urinary tract functions are interrelated. As a result, constipation is often associated with bladder dysfunction, including bladder overactivity (urge), increased or decreased voiding frequency, and bladder underactivity. This relationship between abnormal bowel and bladder function is referred to as bowel bladder dysfunction. Successful treatment of constipation is an important component of treating bladder dysfunction Burgers and colleagues [22].

In 40% of instances, urinary symptoms were evident. This was comparable to the findings of Combs and colleagues [23] who discovered that children with constipation experience urine symptoms more frequently and identified urinary incontinence as the most prevalent urinary symptom in this population.

In our study, all physical findings showed significant improvements after treatment including lax abdomen in 112 out of 114 cases (98.2%), no palpable fecal mass in 67 out of 69 cases (97.1%), Both abdominal pain and urinary complaints showed significant improvement after treatment among 95.3% of children.

Anal skin tags and anal fissures were found in 6% of the children in the current study. Skin tags are frequently linked to anal fissures, which are brought on by frequently having hard stools not just related to inflammatory bowel disease Rouge-Maillart and colleagues [24]. This was also reported by other researchers who found anal fissures and tags to be most commonly associated with constipation Agnarsson and colleagues [25].

A digital anorectal examination is not routinely necessary as it is unpleasant for the child and has only moderate sensitivity and specificity for detecting or confirming constipation in this group of patients Combs and colleagues [23].

A digital examination was done only for the following groups of patients: Infants with constipation, Children with symptoms since early infancy, Infants or children with other alarm signs that suggest organic disease, Children in whom the presence or degree of constipation is unclear (e.g., meeting only one Rome IV criterion). In our study, 8.7% of our cases needed to have a PR examination.

Bristol stool before treatment from type one was 46% and two 48.7% in the current study. The Bristol stool form types 4 and 5 are the most often reported stool form after therapy. This was in line with Sujatha and colleagues findings [26] that type 1 and type 2 Bristol stool forms were the most prevalent in pediatrics constipation and type 4 and 5 Bristol stool forms were the most prevalent in healthy children.

The majority of our cases were not diagnosed as functional constipation; even the diagnosed cases weren't properly managed according to recent ESPGHAN and NASPGHAN therapy recommendations. In the present study, before referral to our clinic, about 62.7% sought medical care for their main complaints, 41.3% were diagnosed with functional constipation, 23.3% and 12.7% of their families were educated on diet regimen with adequate fiber and water intake respectively while 60% didn't receive any pharmacological treatment. The median duration of pre-referral treatment of patient symptoms was 10.5 months which ranged from 1 month to 4 years that mainly included oral softeners (27.3%) and oral stimulants (11.3%). These results were similar to Dehghani and colleagues [27] who observed a similar delay in a tertiary center in Iran. Only 28% of parents complained that their children were constipated. Infrequent defecations were considered by parents as the normal child habit of defecation.

Management of chronic FC and fecal incontinence typically requires a comprehensive program, including the use of laxatives, behavior changes, and dietary changes; Dis-impaction, Prolonged laxative treatment, and behavior therapy to achieve regular evacuation and avoid recurrent constipation, Dietary changes (primarily adequate fiber content) to maintain soft stools, Gradual tapering and withdrawal of laxatives as tolerated.

In this study, the combined laxative and behavioral approach has been used which was largely supported by cohort studies, case−control studies, and clinical experience Loening-Baucke [28].

As regard to treatment, constipation is treated somewhat differently in infants as compared with children. Infants with FC frequently respond to treatment with non-digestible osmotically active carbohydrates (as a part of non-pharmacological management) such as sorbitol-containing juices (e.g., apple, prune, or pear). If these measures are unsuccessful, the addition of osmotic laxatives and/or occasional dis-impaction with glycerin suppositories is usually useful. However, glycerin suppositories should be used with caution because they can enhance anal irritation and cause the symptoms to become chronic. In this study, the use of osmotic laxatives lactulose was effective in 100% of infants Tabbers and colleagues [3].

In older children, dis-impaction can be accomplished with oral medications, rectal medications, or a combination. Using oral rather than rectal medications for most children is suggested particularly in those with a history of painful defecation, or perineal trauma. Oral and rectal medications are often the most effective approach for moderate or severe fecal impaction. In this case, we used two oral medications; an osmotic (lactulose on 3/kg/day) and a stimulant laxative (sodium bisphosphate 2.5−20 mg/day). In indicated cases, bisacodyl was used. The mean duration of fecal dis-impaction was 5.28 ± 2.06 days.

After dis-impaction, patients were treated with a maintenance regimen of oral laxatives to 'retrain 'the bowel and avoid re-impaction, which could restart the constipation cycle. Adequate doses of medication were given to maintain a pattern of soft bowel movements once or twice a day. It was important to start this maintenance regimen of laxatives immediately after dis-impaction to avoid re-accumulation of stools. The regular bowel movement was restored after a mean duration of 32.4 ± 14.6 days that ranged from 18 to 58 days after treatment. Lactulose was used in doses of 1−2 ml/kg/day. If inadequate clinical response stimulant laxative was used (sodium picosulphate 2.5−20 mg/day) for a limited duration.

Parents were advised to adjust the laxative dose according to the response, and to increase the dose every two days until the child has one or two soft stools each day, or to decrease it if the patient develops diarrhea, were warned that some leaking or soiling may continue at first, especially if the child fears or continues to resist having a bowel movement.

All of the investigated kids were instructed to continue receiving maintenance therapy for at least 6−24 months, depending on how each patient was improving clinically, and not stop going to the GI clinic on a regular basis. According to van Ginkel and colleagues [29], maintenance therapy lasts between 6 and 24 months. In a sizable trial involving 300 kids, Clayden [30] found that 44% of the patients needed laxatives for less than a year and 56% of constipated kids needed them for more than a year.

Behavioral modification and education of the patient and family were found to be an integral part of maintenance therapy of constipation in children. Behavior modification was used to recondition the child to normal bowel habits and proper toilet practice. It was important to educate the child's parents about the pathogenesis of constipation, including the cycle of pain, stool withholding, and encopresis Walia and colleagues [31]. A balanced diet that includes whole grains, fruits, and vegetables as a component of the treatment of constipation in children also adequate water intake was encouraged. Dietary changes should not be forced, nor should they replace the other interventions described above Tabbers and colleagues [3]. In the present study, the majority of caregivers (96%) were significantly educated on non-pharmacological management that is suitable for the condition of their adequate fiber diet and fluid intake (93.3%), behavioral modification (92%), and physical activity (39.3%).

Challenges encountered by the management were compliance with treatment (51.3%) unclear medical history (16.7%), and withholding behavior (14.7%), previous investigations (8%); these obstacles were overcome through:

(1) Compliance with treatment was overcome by encouraging regular visits to the clinic and providing the patient with the medication needed, keeping contact with the caregiver, and having a good relationship with the children.
(2) Unclear medical history was another obstacle in (12.7%) the age of onset of constipation couldn't be identified. Also, 6.7% of cases who had stool incontinence were seeking medical advice for diarrhea instead of constipation. The Bristol stool scale was used to clarify the pattern of stool and Roma 4 criteria for diagnosis.
(3) Effective education of the parents and child with regard to constipation is crucial in changing chronic behavior patterns. A primary goal is to remove negative attributions. The child's parent or caretaker should be provided with verbal and printed information. Printed information should

be written in easy-to-understand lay language, with descriptions of the problem and the methods that will be used to solve it. In severe cases, the parents and/or clinician may need to enlist the help of the school and teacher. Some children may benefit from access to a private bathroom. The teacher should be sensitive to the child's problem, permitting him or her to use the bathroom whenever requested Tabbers and colleagues [3].

Previous investigations (8%) made it more difficult to convince the parents or caregivers about the diagnosis and made parents anxious about their child. A clear plan of management could reassure close follow-up and them successfully Weissman and colleagues [32].

One of the strong points of this study was its population-based design, its relatively large sample size, and its assessment of FC symptoms using Rome 4 criteria also; monitoring the most important obstacles that direct the diagnosis and treatment of cases and what has been done to overcome them.

4.1. Conclusion

Constipation in children is a widespread medical issue. According to Rome IV criteria, the diagnosis is made based on the history and a physical examination. Investigations are required only when the diagnosis is ambiguous and when it is necessary to rule out an underlying condition. A toileting program with a reward system, education, demystification, and a daily stool diary are all components of non-pharmacological management. Dis-impaction, maintenance therapy, and eventually weaning off of medication comprise the pharmacological management of FC in children. Before reducing the dosage of the drug gradually, maintenance treatment should be continued for at least 2 months and FC symptoms should be gone for at least 1 month. Even if early, the long-term prognosis is moderate.

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Conflicts of interest

There are no conflicts of interest.

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