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Prevalence of Functional Constipation Among Children Attending Kafr El Sheikh General Hospital

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Abstract

Introduction: One of the most prevalent health issues among children is constipation. The prevalence varies from 0.76 to 29.6% globally. It makes up roughly one-fourth of the consultations in pediatric gastroenterology clinics and 3–5% of office visits in pediatric outpatient practices.

Aim: This study was out to assess the clinical features, precipitating causes, and prevalence of functional constipation in children presenting to Kafr EL Sheikh General Hospital.

Patients and methods: In this cross-sectional study, 2000 Egyptian children with functional constipation, ages 3–15, were seen at Kafr El-Sheikh General Hospital between August 2022 and October 2023.

Results: The age of onset of constipation ranged from 2.33 to 14.17 years. Family constipation was present in (57.25%). Reduced fluid intake, a low-fiber diet, and delaying urges in public were the most common risk factors for constipation. Duration ranged from 5 to 30 months. Abdominal pain occurred in (78.9%). Urinary symptoms occurred in (37.65%). Frequency of bowel movements (BMs) was less than or equal to 2/week in (37.65%). Stool degree according to Pristoll Stool chart 1 in (12.4%), 2 in (34.35%). Pain with BMs was present in (34%) frequency of retentive posturing with BMs was present in (25.1%) of patients.

Conclusion: In children, functional constipation is a prevalent clinical issue. Constipation was associated with a family history of the condition in the children under study. Young children generally consumed too little dietary fiber, children who were constipated consumed significantly less fiber, and children's toilet training was subpar.

Keywords: Children, Functional constipation, Prevalence

1. Introduction

Constipation is a prevalent health issue observed among individuals in the pediatric age bracket. The global prevalence has a range of 0.7%–29.6%. It constitutes around 3–5% of the office visits within the pediatric outpatient setting and nearly a quarter of the consultations conducted in pediatric gastrointestinal clinics.¹

Childhood constipation is a familial concern that exerts adverse effects on the physical, social, emotional, and academic performance of children.

The condition of constipation exerts a substantial influence on the utilization and financial burden of healthcare services.²

The frequency of stool varies among pediatric age groups and tends to decline as children grow older. By the age of four, the majority of children acquire voluntary control of the anal sphincter.³

Childhood constipation typically encompasses challenges in the process of defecation and/or infrequent occurrences of stool movements.⁴ According to the North American Society of Gastroenterology and Nutrition (NASPGHAN), constipation is

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characterized as a prolonged or challenging process of bowel movement, persisting for a duration of at least 2 weeks, and resulting in notable distress for the individual. The phrase 'functional constipation' encompasses all youngsters for whom constipation does not have an underlying biological cause.⁵

Fecal incontinence is characterized by the involuntary discharge of feces into undergarments or in socially unsuitable locations, typically observed in children with a developmental age of at least 4 years. The condition referred to as retentive fecal incontinence in the majority of children is typically attributed to an underlying issue of constipation.⁶

The prolonged period between the identification and management of constipation results in notable morbidity, characterized by the continued presence of unexplained chronic stomach pain, diminished appetite, and instances of stool incontinence. This often results in an extended duration of laxative treatment.⁴

The level of awareness of childhood functional constipation in Egypt is currently limited, and the extent of this issue is often overestimated. Despite the limited availability of epidemiological data, it is widely believed that functional constipation is highly prevalent within modern society.⁷ Regrettably, certain moms exhibit a lack of attention towards addressing the issue of functional constipation in their children.

The objective of this study is to assess the prevalence, precipitating factors, and clinical characteristics of pediatric patients with functional constipation who are receiving care at Kafr EL Sheikh General Hospital.

2. Patients and methods

The present study was a cross-sectional investigation that encompassed a sample of 2000 children from Egypt, ranging in age from 3 to 15 years. These children were diagnosed with functional constipation and received medical care at Kafr EL-Sheikh General Hospital throughout the period spanning from August 2022 to October 2023.

Ethical consideration: The study protocol underwent the process of submission for approval by the Faculty of Medicine at Al-Azhar University. Each parent participating in the study provided informed written consent. The consent of the managers overseeing the health care facilities from which the data for this study was obtained. The study ensured the preservation of confidentiality and personal privacy at all levels. The collected data was not utilized for any other purposes.

Inclusion criteria: Individuals between the ages of 3 and 15, regardless of sex, who have received a diagnosis of functional constipation based on the Rome IV criteria questionnaire.

Exclusion criteria: The study excluded children who had organic causes of constipation, including but not limited to Hirschsprung disease, neurologic disorders, spinal cord injuries or abnormalities, hypothyroidism, cystic fibrosis, and gluten enteropathy.

2.1. Methods

Each youngster was provided with the questionnaire comprises two distinct components. The initial segment encompassed inquiries pertaining to the subsequent factors: age, sex, weight, height, body mass index (BMI), existence of illnesses, and age of commencement of constipation. There are various categories of individuals responsible for the care and supervision of children, which include individuals who gather information on the child's past, the age at which toilet training commenced, the consumption of meals and liquids, as well as the presence of siblings. Furthermore, the individual's medical background includes a familial predisposition to constipation, as well as a history of dietary habits.

The subsequent segment pertains to the Rome IV criteria questionnaire, which has been endorsed by the Rome Foundation for the purpose of diagnosing functional constipation in pediatric patients:

Infants and toddlers up to 4 years old: a minimum duration of 1 month was observed for the presence of at least two of the following: the individual exhibits a frequency of defecation that is two or less instances per week. Additionally, there is a documented history of severe stool retention, painful or hard bowel movements, and the passage of big diameter stools. Furthermore, there is evidence of a substantial fecal mass located inside the rectal region.

In the context of children who have acquired toilet training skills, it is possible to consider the incorporation of supplementary criteria. Following the learning of toileting skills, individuals may experience a minimum of one episode per week of incontinence. Additionally, there may be a documented history of passing big diameter stools that have the potential to block the toilet.

Children with developmental age of at least 4 years: At a minimum frequency of once per week for a duration of at least 1 month, there was evidence of the presence of at least two of the following factors.

The individual experiences a frequency of two or fewer bowel movements per week, accompanied by at least one instance of involuntary passage of feces per week. Additionally, there is a history of adopting a posture indicative of withholding or excessive voluntary retention of stool, as well as a history of painful or difficult bowel movements. The presence of a substantial fecal mass in the rectum and a history of passing stools of large diameter that may impede toilet evacuation are also observed. Furthermore, it is important to note that these symptoms cannot be entirely accounted for by another underlying medical condition.⁸

Our designed included the followings: The study examines the frequency of bowel movements (BMs) categorized into six groups: less than 2/week, 3–6/week, 1/day, 2–3/day, greater than 3/day, and unknown. Additionally, the study assesses stool consistency, which is classified as very hard, hard, soft, loose, or unknown. The classification of stool type is determined by referencing the Bristol Stool Form Scale, which categorizes stools into several types:

Bristol stool chart: The clinical assessment instrument was established in 1997. The Bristol Stool Chart (Fig. 1) categorizes stools into seven distinct categories. The Bristol Stool Chart, also known as the Bristol Stool Scale, is a medical tool developed for the purpose of categorizing fecal matter into seven distinct categories. Types 1 and 2 are indicative of constipation, while Types 3 and 4 are considered optimal as they denote stools that are easier to pass. Conversely, Types 5 through 7 may suggest the presence of diarrhea and an urgent need for bowel movement.⁹



Fig. 1. Bristol stool chart.

The duration of firm stools can be categorized into four time intervals: less than 1 month, 1 month, 2 months, and greater than 3 months. Have you experienced pain or straining during bowel movements over the past 2 months? Is there a documented history of a significant accumulation of fecal matter in the rectum? Has there been a history of significant fecal matter blocking the toilet within the past 2 months?

The frequency of posture during bowel movements might vary, ranging from infrequent occurrences of 1–3 times per month, to once per week, several times per week, daily, or never. The frequency of dirty underwear can be categorized into five distinct groups: 1–3 times per month, once per week, several times per week, everyday, and never. The incidence of fecal contamination in undergarments, characterized by the presence of stains, partial stool marks, or a significant quantity of fecal matter.

2.2. Statistical analysis

The statistical analysis was conducted using SPSS v26 (IBM Inc., Chicago, IL, USA). The presentation of quantitative variables involved the use of mean and standard deviation (SD). The qualitative variables were represented in the form of frequencies and percentages (%).

Descriptive statistics: The quantitative data was represented using descriptive statistics, specifically the mean and standard deviation (mean \pm SD). The qualitative data was represented using numerical values and percentages.

Analytical statistics: The comparison of groups was conducted using the Chi-square test (χ^2), which is commonly employed for the analysis of qualitative data. The Student's *t*-test is a statistical method used to compare quantitative data from two independent samples, assuming that the data follows a normal distribution and that the variances of the two samples are equal. The confidence level for the coefficient interval was established at 95%. The degree of significance was determined by calculating the probability (*P*) values as follows: a significance level of *P* less than 0.05 was deemed to be statistically significant.

3. Results

The present cross-sectional study comprised a sample of 2000 children from Egypt, ranging in age from 3 to 15 years, who were diagnosed with functional constipation and received medical care at Kafr El Sheikh General Hospital.

The age ranged from 3 to 15 years with a mean value (\pm SD) of 8.88 (\pm 3.76) years. Sex was male in 862 (43.1%) patients and female in 1138 (56.9%) patients. The weight ranged from 12 to 60 kg with a mean value (\pm SD) of 35.53 (\pm 15.05) kg. The height ranged from 0.955 to 1.735 m with a mean value (\pm SD) of 1.34 (\pm 0.24) m. The BMI ranged from 13.16 to 20.24 kg/m² with a mean value (\pm SD) of 18.61 (\pm 2.2) kg/m². The age of onset of constipation ranged from 2.33 to 14.17 years with a mean value (\pm SD) of 7.4 (\pm 3.53) years, **Table 1** (See **Fig. 2**).

The potty training ranged from 4 to 16 months with a mean value (\pm SD) of 14 (\pm 7) months. Family constipation was present in 1145 (57.25%) patients. Caretaker was mother in 1057 (52.85%) patients. Siblings were present in 1234 (61.7%) patients. Water intake ranged from 191 to 679 ml with a mean value (\pm SD) of 430.6 (\pm 140.65) ml, **Table 2**, **Fig. 3**.

Decreased fiber intake occurred in 1732 (86.6%) patients. Diminished fluid intake occurred in 1479

Table 1. Demographic data of the studied patients.

	N = 2000
Age (y)	
Mean \pm SD	8.9 \pm 3.76
Range	3–15
Sex	
Male	862 (43.1%)
Female	1138 (56.9%)
Weight (kg)	
Mean \pm SD	35.5 \pm 15.05
Range	12–60
Height (m)	
Mean \pm SD	1.3 \pm 0.24
Range	0.96–1.74
BMI (kg/m ²)	
Mean \pm SD	18.6 \pm 2.2
Range	13.16–20.24
Age of onset of constipation (years)	
Mean \pm SD	7.4 \pm 3.53
Range	2.33–14.17

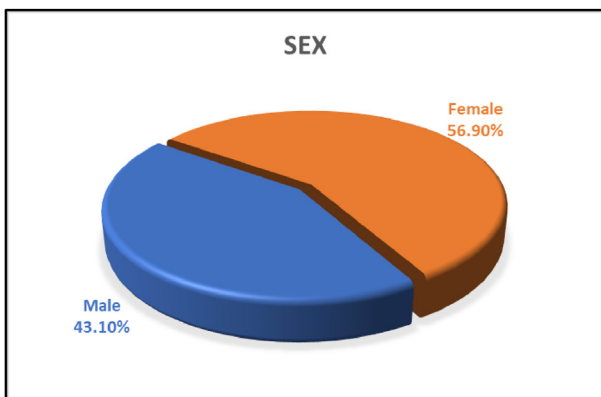


Fig. 2. Sex of the studied patients.

Table 2. Questionnaire of potty training, family constipation, caretaker, siblings and water intake of the studied patients.

	N = 2000 [n (%)]
Potty training (Months)	
Mean \pm SD	14 \pm 7
Range	4–16
Family constipation	
Yes	1145 (57.25)
No	855 (42.75)
Caretaker	
Mother	1057 (52.85)
Other	943 (47.15)
Siblings	
Yes	1234 (61.7)
No	766 (38.3)
Water intake (ml)	
Mean \pm SD	430.6 \pm 140.65
Range	191–679

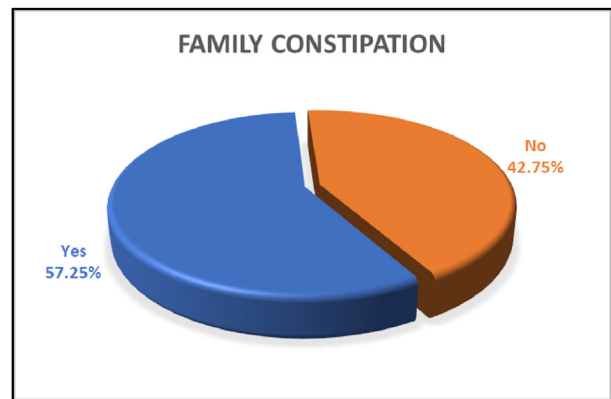


Fig. 3. Family constipation of the studied patients.

(73.95%) patients. Urge postponing at public places occurred in 1247 (62.35%). Problems during toilet training occurred in 532 (26.6%) patients, **Table 3**, **Fig. 4**.

The duration ranged from 5 to 30 months with a mean value (\pm SD) of 25 (\pm 8) months. Abdominal

Table 3. Precipitating factors of the studied patients.

	N = 2000 [n (%)]
Decreased fiber intake	
Yes	1732 (86.6)
No	268 (13.4)
Diminished fluid intake	
Yes	1479 (73.95)
No	521 (26.05)
Urge postponing at public places	
Yes	1247 (62.35)
No	753 (37.65)
Problems during toilet training	
Yes	532 (26.6)
No	1468 (73.4)

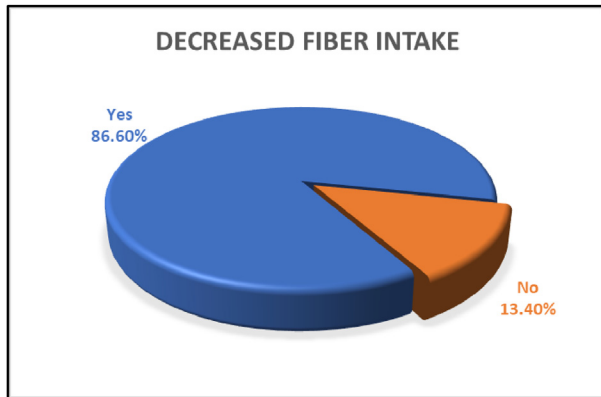


Fig. 4. Decreased fiber intake of the studied patients.

pain occurred in 1578 (78.9%) patients. Appetite was good in 279 (13.95%) patients, fair in 1201 (60.05%) patients and poor in 520 (26%) patients. Abdominal distention occurred in 919 (45.95%) patients. Bleeding per rectum occurred in 424 (21.2%) patients. Stool incontinence occurred in 574 (28.7%) patients. Nausea occurred in 423 (21.15%) patients. Urinary problems occurred in 753 (37.65%) patients. Weight gain was good in 260 (13%) patients, fair in 1257 (62.85%) patients and poor in 483 (24.15%) patients, Table 4, Fig. 5.

Table 4. Clinical symptoms of the studied patients.

	N = 2000 [n (%)]
Duration (months)	
Mean \pm SD	25 \pm 8
Range	5–30
Abdominal pain	
Yes	1578 (78.9)
No	422 (21.1)
Appetite	
Good	279 (13.95)
Fair	1201 (60.05)
Poor	520 (26)
Abdominal distention	
Yes	919 (45.95)
No	1081 (54.05)
Bleeding per rectum	
Yes	424 (21.2)
No	1576 (78.8)
Stool incontinence	
Yes	574 (28.7)
No	1426 (71.3)
Nausea	
Yes	423 (21.15)
No	1577 (78.85)
Urinary problems	
Yes	753 (37.65)
No	1247 (62.35)
Weight gain	
Good	260 (13)
Fair	1257 (62.85)
Poor	483 (24.15)

Frequency of bowel movements was less than or equal to 2/week in 753 (37.65%) patients. Stool consistency was very hard in 720 (36%) patients, hard in 461 (23.05%) patients, soft in 314 (15.7%) patients, loose in 230 (11.5%) patients and unknown in 275 (13.75%) patients. Stool degree was 1 in 248 (12.4%) patients, 2 in 687 (34.35%) patients and 3 in 1065 (53.25%) patients. Pain with BMs was present 680 (34%) in patients. The history of obstructing toilet by stool was present in 611 (30.55%) patients. The history of large fecal mass in the rectum was present in 729 (36.45%) patients. The number of soiled underwear was 1–3/month in 297 (14.85%) patients, once/week in 196 (9.8%) patients, several times/weeks in 174 (8.7%) patients, daily in 93 (4.65%) patients and never in 1240 (62%) patients. Frequency retentive posturing with bowel motion was 1–3/month in 229 (11.45%) patients, once/week in 126 (6.3%) patients, several times/weeks in 88 (4.4%) patients, daily in 59 (2.95%) patients and never in 1498 (74.9%) patients, Table 5, Fig. 6.

There was positive correlation between Decreased fiber intake and diminished fluid intake and between poor appetite and poor weight gain (P value < 0.001), Table 6.

4. Discussion

Functionally, a significant proportion of visits to pediatric gastroenterologists, ~25%, and a smaller percentage, around 3%, of general pediatric outpatient visits worldwide are attributed to the condition of functional constipation.¹⁰

The age range of participants in our study spanned from 3 to 15 years, with a mean age of 8.88 years and a standard deviation of 3.76 years. In the studied population, the sex distribution was as follows: 862 individuals (43.1%) were identified as male, while 1138 individuals (56.9%) were identified as female.

These findings are in accordance with Walter et al., 2019¹¹ The study reported a higher prevalence of females compared with males, with 560 (50.3%) girls and 553 (49.7%) boys. The mean age of the girls was 20.5 \pm 10.9 months, while the mean age of the boys was 20.9 \pm 11.5 months. Overall, the mean age of the children in the study was 20.7 \pm 11.2 months.

On the other hand, Wang et al., 2021¹² had different results as they found that mean age of functional constipation is 60 months with predominance of male sex as male ratio to female was 1.06 : 1.

In our results, the weight ranged from 12 to 60 kg with a mean value (\pm SD) of 35.53 (\pm 15.05) kg. The

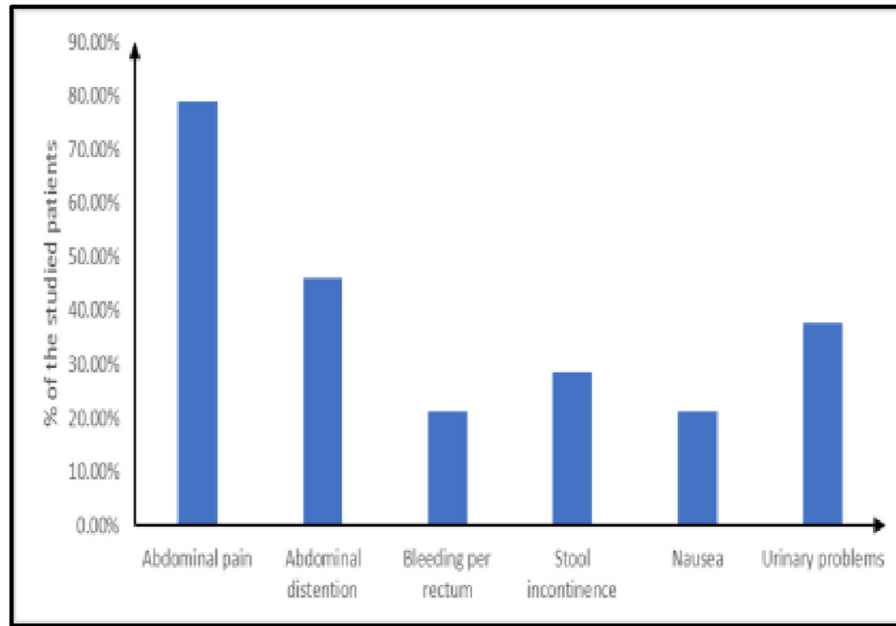


Fig. 5. Clinical symptoms of the studied patients.

Table 5. Rome IV criteria questionnaire of the studied patients.

	N = 2000 [n (%)]
Frequency of bowel movements	
≤2/week	753 (37.65)
Stool consistency	
Very hard	720 (36)
Hard	461 (23.05)
Soft	314 (15.7)
Loose	230 (11.5)
Unknown	275 (13.75)
Type of stool (according to type of stool chart)	
1	248 (12.4)
2	687 (34.35)
3	1065 (53.25)
Pain with BMs	
Yes	680 (34)
No	1320 (66)
History of obstructing toilet by stool	
Yes	611 (30.55)
No	1389 (69.45)
History of large fecal mass in the rectum	
Yes	729 (36.45)
No	1271 (63.55)
Number of soiled underwear	
1–3/month	297 (14.85)
Once/week	196 (9.8)
Several times/weeks	174 (8.7)
Daily	93 (4.65)
Never	1240 (62)
Frequency retentive posturing with bowel motion	
1–3/month	229 (11.45)
Once/week	126 (6.3)
Several times/weeks	88 (4.4)
Daily	59 (2.95)
Never	1498 (74.9%)

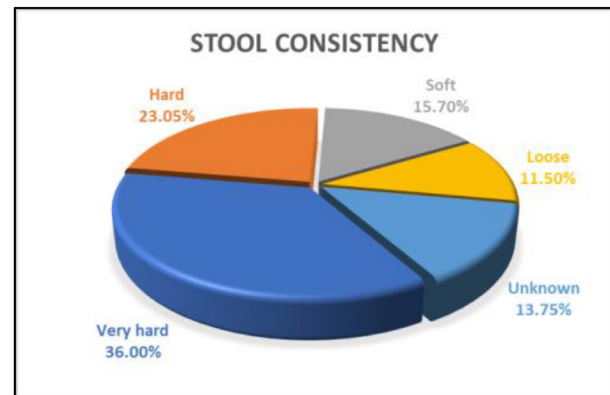


Fig. 6. Stool consistency of the studied patients.

Table 6. Correlation between (decreased fiber intake and diminished fluid intake) and between (poor appetite and poor weight gain) of the studied patients.

	N = 2000
	Decreased fiber intake
Diminished fluid intake	
r	0.642
P value	<0.001*
Poor weight gain	
r	0.963
P value	<0.001*

*: Significant as P value less than or equal to 0.05.

height ranged from 0.955 to 1.735 m with a mean value (\pm SD) of 1.34 (\pm 0.24) m. The BMI ranged from 13.16 to 20.24 kg/m² with a mean value (\pm SD) of 18.61 (\pm 2.2) kg/m².

These results like those of Chang et al., 2013¹³ who noted that children had constipation were 11 patients had less than 10th percentile of BMI percentile, 12 patients 85th–95th percentile, and three patients had greater than 95th percentile.

Regarding the elucidation of this discovery, it is noteworthy that constipation can give rise to abdominal discomfort, soiling (characterized by the leakage of stool into a child's garments), diminished appetite, impaired behavior, decreased mood, and growth impairments, as well as reduced body weight. These consequences observed in children experiencing constipation may be attributed to inadequate protein, energy, and/or mineral intake (Leung and Hon 2021).¹⁴

However, Kavehmanesh et al., 2013¹⁵ The findings of the study indicated that there were contrasting outcomes, as the researchers detected a higher prevalence of obesity and overweight among constipated children in comparison to those with regular bowel movements.

The age at which constipation first appeared in our study varied between 2.33 and 14.17 years, with a mean value of 7.4 years and a standard deviation of 3.53 years.

Our results agreed with Malowitz et al., 2016¹⁶ who found that the age of onset of constipation was 3.3 years, with the 25th percentile having onset occur at 0.8 years and the 75th percentile at 4.8 years.

Regarding to our results, the potty training ranged from 4 to 16 months with a mean value (\pm SD) of 14 (\pm 7) months.

These are in accordance with Benninga et al., 2019¹⁷ who noted that constipated children started toilet training at 4–16 months.

However, Park et al., 2016¹⁸ had different results as they observed that children with functional had started potty training at 20–30 months.

Regarding to our results, family constipation was present in 1145 (57.25%) patients. Caretaker was mother in 1057 (52.85%) patients. Siblings were present in 1234 (61.7%) patients.

Levy et al., 2017¹⁹ agreed to these results who stated family history of functional constipation in children of functional constipation.

Also, Huang et al., 2013²⁰ had the same findings as they noted that siblings were present about 62% of patients.

Owing to our results, water intake ranged from 191 to 679 ml with a mean value (\pm SD) of 430.6 (\pm 140.65) ml.

Bae et al., 2016²¹ had the same results as he noted that water intake of children of functional constipation was about 600 ml.

Based to our results, decreased fiber intake occurred in 1732 (86.6%) patients. Diminished fluid intake occurred in 1479 (73.95%) patients.

These results agree with Vandenplas and Devreker, 2019²² that stated that children with functional constipation mostly reported low fiber and fluid intake.

We found that urge postponing at public places occurred in 1247 (62.35%). Problems during toilet training occurred in 532 (26.6%) patients.

These findings are in accordance with Khalil and Alkot, 2018⁷ who stated that children suffer from functional constipation had problems during toilet training and urge postpone at public places as attributed in our cases to the lack of clean public toilets.

Based to the results, the duration ranged from 5 to 30 months with a mean value (\pm SD) of 25 (\pm 8) months.

Pijpers et al., 2010²³ found the same of our findings as they observed that duration of constipation ranges from 5 to 30 months in functional constipating children. Based to the results, the duration ranged from 5 to 30 months with a mean value (\pm SD) of 25 (\pm 8) months.

In agreement to our results, Dehghani et al., 2015²⁴ supported that results as they noticed that pediatric with functional constipation had symptoms as fecal soiling in (33.8%) only and fecal mass in (9.5%).

Opposing to our results, Chang et al., 2013¹³ The study yielded contrasting findings, as it indicated that the prevailing complaints were characterized by hard stool consistency (60%), painful bowel movements (60%), and a past occurrence of large stools in the lower abdomen (68%), in contrast to the remaining symptoms of retentive posturing (37%), infrequent bowel movements of less than 2 per day (35%), and weekly episodes of soiling (16%). The frequency of straining during bowel movements was found to be higher compared with both urgency and incomplete bowel movements, as indicated in Table 3. A significant proportion, specifically 63%, of children experiencing constipation exhibited prolonged episodes of soiling lasting beyond a duration of 2 months.

4.1. Recommendations

Our study recommended Further studies for correlation with our results. Laboratory investigation of patients and clinical examination for exclusion of organic causes of constipation.

4.2. Conclusion

Functional constipation is a prevalent clinical issue observed in pediatric patients. The occurrence of constipation in the children under study was found to be associated with a familial history of the condition. Young children exhibited a prevalent insufficiency in the consumption of dietary fiber. Notably, constipated children displayed a significantly reduced intake of fiber. Additionally, inadequate toilet training practices were observed in children.

Conflicts of interest

There are no conflicts of interest.

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