Original Article

Effectiveness of Bowel Management Program for Functional Constipation in Children

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A R T I C L E I N F O

Key Words:
Bowel Management Program, Children, Fecal Incontinence, Functional Constipation

How to Cite:

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Received Date: 9th May, 2023
Acceptance Date: 28th May, 2023
Published Date: 31st May, 2023

A B S T R A C T

Functional constipation (FC) is a common problem in childhood, with an estimated prevalence of 3% worldwide. Objective: To determine the effectiveness of bowel management program in children with functional constipation. Methods: This quasi-experimental study was conducted at Department of Pediatric Surgery, NICH, Karachi, from September 2019 to November 2021. 91 children were included in the study. Informed consent was taken. A plain X-ray abdomen prior to the start of bowel management program was done to assess the fecal loading in the colon. Effectiveness of program was assessed in terms of stool frequency of 1, 2 per day and non-loading of rectum radiologically after one month of treatment. High dose laxatives were started after the patient had recovered from the first impact in older kids who had previously completed toilet training but now suffer soiling from incontinence or severe constipation without soiling. Daily big volume enemas were used in children who had never been toilet trained, had a history of soiling, or had a megarectum. Results: The mean age was 5.26 ± 2.20 years (95% confidence interval [CI]: 4.80-5.72), the mean weight was 17.49 ± 3.24 kg (95% CI: 16.82-18.17), the mean height was 107.27 ± 19.32 cm (95% CI: 103.24-111.29). The average duration of functional constipation was 88.11 ± 68.79 days (95% CI: 73.78-102.44). In terms of gender distribution, 63 (69.2%) patients were male, while 28 (30.8%) were female. Conclusions: The results of this study provide evidence that a bowel management programme is successful in treating functional constipation in young children.

I N T R O D U C T I O N

Constipation is defined as “functional constipation when no other organic cause like Hirschsprung disease, anorectal malformations, neuromuscular disease; metabolic to endocrine disorders can be identified [1]. In 95% of children the constipation is functional constipation. From minor constipation that can be treated with dietary changes to severe, incurable condition that requires hospitalisation, the severity might vary [2]. These symptoms may have significant impact on child’s physical and psychological wellbeing and quality of life. Early identification of the problem and therapeutic intervention is required for the effective management of childhood FC.

Different studies have been conducted to develop a systemic approach and practical guidelines for the management of functional constipation [2-6]. In one study of Koppen et al., they divided the management in nonpharmacological (education, dietary modification, toilet training) and pharmacological interventions (disimpaction of impacted stool in rectum by per rectal enemas or oral laxative, maintenance treatment, and weaning) [3]. The Drs. Pena and Levitt programme is the inspiration for our bowel management programme [7-9]. They have shown that this method is also successful in treating young patients with idiopathic constipation (89%
success rate). They have claimed a 95% success rate in treating children with fecal incontinence due to underlying diseases or anatomical defects [2]. Another study found that 78% of kids with functional constipation benefited from bowel management programmes [10]. Laxatives, enemas, dietary changes, behavioural adjustments, psychosocial interventions, and patient and family education have all been used to treat functional constipation, sometimes with a focus on one of these components [11]. Though functional constipation affects nearly 95% of all children with constipation, it has received much less attention than other types of constipation. In Pakistan, there isn’t a single institution that is dedicated just to treating functional constipation in children. Therefore, the purpose of the current study is to determine if a bowel management programme is useful for treating functional constipation in young patients.

METH O DS

From September 2019 to November 2021, this quasi-experimental study was carried out at the National Institute of Child Health's Department of Pediatric Surgery in Karachi, Pakistan. 91 children, aged 3 to 12 years, of either gender, who met the Rome IV criteria for idiopathic constipation were classified as having functional constipation; children with a history of anorectal malformation, Hirschsprung's disease, spina bifida, spinal cord injury, or sacrococcygeal teratoma, as well as those with neurological or other organic causes of constipation, were excluded from the study, as were children whose parents did not consent. The sample size was calculated by Openepi sample size calculator with 9% margin of error and 95% confidence level and taking the efficacy of Bowel management program in children with functional constipation as 78% [10], the sample size came to be 82. An additional 10% sample was taken to compensate for lost to follow up. The total sample size thus become 91. The data regarding age, gender, weight, height, BMI and duration of functional constipation was recorded in kilograms. The exact age of the child in years and months was determined. The measurements were then plotted on the appropriate CDC growth chart for the child's age and sex. The intersection point of the height and weight on the chart was found, which corresponded to a specific BMI value. The BMI percentile was interpreted to classify the child’s weight status. Less than the 5th percentile indicated underweight, 5th to less than the 85th percentile indicated normal weight, 85th to less than the 95th percentile indicated overweight, and equal to or greater than the 95th percentile indicated obesity. It was recommended to consult with a healthcare professional for a comprehensive interpretation of the child's BMI using the CDC growth charts. All the patients underwent “bowel management program. A plain X-ray abdomen prior to the start of bowel management program was done to assess the fecal loading in the colon. At first follow-up visit after two week a Plain X-ray abdomen was done to see the response radiologically. Effectiveness of program was defined as having stool frequency of 1, 2 per day and non-loading of rectum and left colon (evident by Plain X-Ray Abdomen), after one month of treatment. Bowel management programs was designed in a structured course of medical treatment for pediatric constipation including dietary modification with greater, toilet training and stool dis-impaction by per rectal enema or oral laxatives. It is designed as per following age groups.

<table>
<thead>
<tr>
<th>Components</th>
<th>Age Groups</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>3-5 Years</td>
</tr>
<tr>
<td>Fiber Intake</td>
<td>20 grams/day</td>
</tr>
<tr>
<td>Fluid Intake</td>
<td>1-1.3 liters/day</td>
</tr>
<tr>
<td>Toilet Routine</td>
<td>Scheduled toilet visits after meals</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Encourage active play</td>
</tr>
<tr>
<td>Stool Softener / Laxatives Usage</td>
<td>Children with history of soiling or in those children with a megarectum, daily large volume enemas (saline/Phosphate or Soap enema, 15-20ml/kg/day) were used.</td>
</tr>
</tbody>
</table>

Table 1: Distribution of components and age groups

Data were analyzed by using SPSS version-23.0. Mean ± SD was calculated for age, weight, height, BMI and duration of functional constipation. Frequency and percentage were calculated for gender and efficacy. Effect modifiers were controlled through stratification of age, gender, BMI and duration of functional constipation to see the impact of these on efficacy.

R ES ULTS

The results showed that the mean age was 5.26 ± 2.20 years (95% confidence interval [CI]: 4.80–5.72), the mean weight was 17.49 ± 3.24 kg (95% CI: 16.82–18.17), the mean height was 107.27 ± 19.32 cm (95% CI: 103.24–111.29). The average duration of functional constipation was 88.11 ± 68.79 days (95% CI: 73.78–102.44) as shown in Table 2.

Table 2: Descriptive Statistics for Variables of Functional Constipation (N=91)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± SD</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>5.26 ± 2.205</td>
<td>0.231</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>17.49 ± 3.243</td>
<td>0.340</td>
</tr>
</tbody>
</table>
A “common complaint in childhood is constipation” [9, 10]. It remains a challenging condition for pediatric patients, their families, and medical professionals despite its high frequency. The etiology of pediatric constipation is probably complicated, and an organic condition rarely causes it. According to study, children’s constipation is not properly treated [11]. Children who suffer from constipation may have severe abdominal pain, decreased appetite, faecal incontinence, low self-esteem, social isolation, and family disturbance if the condition is not recognised or treated properly. Prompt and extensive treatment interventions are beneficial for children with constipation. It has been observed that functional constipation (FC) affects between 0.7 and 29.6% of children worldwide, with a mean female-to-male ratio of 2.1:1 [13]. Faecal incontinence, painful defecation, hard and/or big stools, and infrequent bowel motions are all symptoms of FC. Abdominal pain is frequently present as well [14]. These signs and symptoms may significantly affect a child’s quality of life and general health [15]. According to estimates, in the USA, children’s constipation accounts for up to 25% of visits to a pediatric gastroenterologist and 3% of visits to a general pediatrician [16]. Additionally, ambulatory care expenses and, to a lesser extent, costs associated with hospitalizations and ER visits are the main reasons why healthcare costs for children with constipation are higher than those for control individuals [17]. Around the world, the prevalence of constipation in children ranges from 0.3% to 8% [18]. Most kids have infrequent, painful defecation and uncontrollable loss of faeces when they first show up. 40% of people struggle with depression, social isolation, and family-related emotional issues [19]. Functional constipation (FC) is the term for cases of constipation in children where no organic cause has been identified (around 90% of cases) [20]. Retentive posture following a hard, painful, or terrifying bowel movement is the most frequently suggested theory for the etiology of FC [21]. Dyssynergic defecation, inadequate faecal evacuation, faecal impaction, (overflow) faecal incontinence, reduced rectal feeling, and loss of the natural urge to urinate are all side effects of withholding [22]. Dyssynergic defecation is the term used to describe malfunctioning of the PFM during a bowel movement [23]. One of the most frequent gastrointestinal problems in children is constipation, which has an estimated incidence of at least 3% [24, 25]. 10% to 25% of paediatric gastroenterologists’ referrals are for constipation [25], however only 5% of these kids have a known underlying reason [26]. When no anatomical, physiological, or histologic cause of constipation can be found, idiopathic or functional constipation is a diagnosis of exclusion. The Rome IV criteria were developed to help define functional constipation consistently. According to this definition, children must experience at least two of the following symptoms less than three times per week: straining more than 25% of the time, lumpy or hard stools more than 25% of the time, anorectal obstruction more than 25% of the time, incomplete evacuation more than 25% of the time, and manual defecation aids more than 25% of the time [27]. Constipation has a wide range, from moderate cases
that can be managed with dietary changes to severe, incurable conditions that need hospitalisation for treatment. In the most severe cases, primary care physicians and gastroenterologists’ nutritional and drug therapies for constipation in children frequently fail. We reasoned that these kids’ symptoms would be improved and their need for hospital stays for obstructive symptoms would be reduced by an organised approach to bowel management, comparable to our programme used for patients with anorectal anomalies. The mean age in our study was 5.26 ± 2.20 years. 7 years was found to be the mean age by Kilpatrick et al. [7]. Another study noted as 11.2 ± 3.8 years [28]. 63 (69.2%) were male while 28 (30.8%) were female. There were 24 (55%) male patients noted in the findings of Russell, et al., [2]. Another study documented as 175 (61.40%) male and 110 (38.60%) female [7]. 55% male cases were reported in the study of Koppen et al., [28]. Effectiveness of bowel management program was found to be in 85 (93.4%) patients. Kilpatrick et al., reported efficacy as 233 (87%) [7]. Efficacy of 72% was found in Koppen et al., [28]. Efficacy was found in 92.3% of patients in the study of van Engelenburg-van Lonkhuyzen et al., [29]. In present study, stratification of confounders/effect modifiers with respect to efficacy, significant difference was reported in age group (p=0.040), body mass index (p=0.031), duration of functional constipation (p=0.014), whereas insignificant difference was recorded in gender (p=0.397).

**CONCLUSIONS**

The findings of this study provide evidence supporting the effectiveness of a bowel management program in children with functional constipation. However, further clinical trials are required to assess the efficacy of this program and validate the current study’s results.

**Authors Contribution**

Conceptualization: SA
Methodology: FM, NK, MA
Formal Analysis: AAK
Writing-review and editing: SA, NZ, MA

All authors have read and agreed to the published version of the manuscript

**Conflicts of Interest**

The authors declare no conflict of interest.

**Source of Funding**

The authors received no financial support for the research, authorship and/or publication of this article.

**REFERENCES**


