Original Article

Effect of Cow's-milk-free Diet on Pediatric Chronic Constipation

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Abstract

Background: Chronic constipation in children can severely impact the quality of life. Emerging evidence suggests a potential link between dietary factors, such as cow's milk and constipation. Some studies suggest that cow's-milk-free diets (CMFD) may alleviate symptoms in pediatric patients.

Objective: To investigate the effect of cow's milk-free diet on pediatric chronic constipation.

Methods: This randomized control trial was conducted at the Department of Pediatrics, Combined Military Hospital, Dhaka, Bangladesh from June 2024 to December 2024. The study involved the enrollment of 60 children aged between 4 to 14 years, all of whom had been managed by using laxatives for a minimum of 3-months tenure without any improvement and met the Rome IV criteria for chronic constipation. The participants were assigned (Randomly) into two groups. The case group (30 participants) received (Taken) a cow's milk-free diet (CMFD) and calcium supplements for 4 weeks, while the participants (n=30) of another group (Control) had no restrictions on cow's milk or dairy products. The data were analyzed by using SPSS v26.0 software.

Results: In this study, comparing the Rome criteria of the control group before and after the 4-week trial, no significant difference was found, except for the parameter "The presence of a large fecal mass in the rectum" (p=0.032). Conversely, comparing the Rome criteria (RC) of the case group before and after the 4-week trial, significant differences were found in the scores for all parameters, with p-values less than 0.001.

Conclusion: Children having chronic constipation (CC) that does not cure or respond to laxative treatment may get benefit from a CMFD (Cow's milk-free diet) and dairy-free diet. Some children can experience notable improvements in bowel function and overall health by removing CMFD and dairy products from their diet.

Keywords: Effect, Cow's-milk-free Diet, CMFD, Children, Laxative.

Introduction

Functional constipation (FC) is a prevalent concern in childhood, affecting approximately 3% of children globally.[1] In 17-40% of cases, constipation occurs within the first (After delivery) year of life.[2] This condition is frequently related to infrequent or PBM (Painful bowel movements), abdominal pain and fecal incontinence which can significantly distress both the child and their family and lead to substantial health care expenses.[3] Chronic constipation, indicated by having a bowel movement every 3 to 15 days[4], is frequently seen in children. The prevalence of chronic constipation is estimated to be as high as 36% among children who consult a pediatrician.[5] A potential cause of chronic constipation is believed to be sensitivity to protein from cow's milk.[6] Although it is prevalent, the specific reason for CC (chronic constipation) is still unidentified.[7] Initial treatments usually involve nutritional modifications, such as a fiber-rich diet or the use of laxatives. It is essential to first rule out secondary causes, including hypothyroidism, congenital gastrointestinal diseases, or medication reactions.[8]

While chronic diarrhea is the most prevalent gastrointestinal symptom of intolerance to cow's milk in children, some reports have associated a CMA (Cow's milk allergy) with CC.[9] Intolerance to CM may turn to severe PL (Perianal lesions), subsequent constipation as well as painful defecation.[10] Studies indicate that a CMFD was effective for 28% to 78% of children with constipation.[8] According to Iacono et al, cow's milk intake was associated with constipation in nearly two-thirds of children suffering from constipation[10]; however, Simeone's study contradicted this finding.[11] CMA may also contribute to a lack of response to laxative treatments in children suffering from constipation (Chronic).[12] The objective of this current research was to assess the impact of a CMFD on chronic constipation in children.

Materials and Methods

This was a randomized control trial that was conducted in the Department of Pediatrics, Combined Military Hospital, Dhaka, Bangladesh from June 2024 to December 2024. In this study, 60 children aged 4-14 years were enrolled purposively, all of whom had been treated with laxatives for at least three months without improvement and met the Rome IV criteria for chronic constipation.[13] Participants were divided into two groups randomly. The case group (30 participants) received a cow's milk-free diet (CMFD) along with calcium supplements for 4 weeks, while the control group (30 participants) had no restrictions on cow's milk and dairy products. Both groups received laxatives (Lactulose 1ml/kg/day) for 4 weeks.[8] Responsiveness was described as the reduction of symptoms and signs according to Rome IV criteria.[14] The study received

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approval from the hospital's ethical committee. Written consent was obtained from all participants before data collection. The inclusion criteria comprised children who fulfilled the Rome IV criteria for chronic constipation, those aged between 4 and 14 years, and those treated with laxatives for at least three months without improvement. Additionally, only children having no red flag symptoms such as delayed passage of meconium, vomiting, fever, severe abdominal distension, rectal bleeding (unless attributable to an anal fissure), weight loss or poor weight gain, or anomalies related to Hirschsprung disease were included. The exclusion criteria included children younger than 4 years and older than 14 years. Additionally, children with anatomical reasons for constipation, such as Hirschsprung disease or spinal diseases, a history of anal surgery, or the use of medications causing constipation were excluded. Children with constipation due to other disorders, such as psychomotor retardation, cerebral palsy, hypothyroidism, cystic fibrosis, and celiac disease, were also excluded. All demographic and clinical information of the participants was recorded. Data were processed, analyzed, and disseminated using MS Office and SPSS v26.0 as needed. In the statistical analysis, a P value of less than 0.05 was considered significant.

Results

In this study, among the total of our participants, 57% (n=34) were male whereas the rest 43% (n=26) were female. The mean age of participants was 6.33 ± 0.5 years in the case group and 6.6 ± 0.6 years in the control group (p=0.063). Breastfeeding in infancy was similar: 19 cases and 20 controls (p=0.787). A family history of constipation was noted in 8 cases and 7 controls (p=0.766). History of atopic diseases was observed in 3 cases and 2 controls (p=0.643) and family history of atopic diseases was reported in 2 cases and 4 controls (p=0.398). The p-values indicate no significant differences between the groups across these clinical characteristics. In comparing the Rome criteria in both groups of children with chronic constipation before the trial we did not find any significant difference regarding the scores. Regarding all the parameters the p-values were greater than 0.05. When comparing the Rome criteria of the control group before and after the 4-week trial, we did not find any significant differences in the scores, except for the parameter 'The presence of a large fecal mass in the rectum' (p=0.032). However, when comparing the Rome criteria of the case group before and after the 4-week trial, we found significant differences in the scores for all parameters, with p-values less than 0.001.

Table-I: Clinical characteristics of participants

Characteristics	Groups		p-value
	Case (n=30)	Control (n=30)	
Mean age (Year)	6.33±0.5	6.6 ±0.6	0.063
Breastfeeding at infancy	19	20	0.787
Family history of constipation	8	7	0.766
History of atopic diseases	3	2	0.643
Family history of atopic diseases	2	4	0.398

Table-II: Comparison of Rome criteria in children with chronic constipation before trial

Parameter	Groups		p-value
	Case (n=30)	Control (n=30)	
≤ 2 defecations per week	24	26	0.491
≥ 1 episode/week of incontinence after the acquisition of toileting skills	18	17	0.794
History of retentive posturing or excessive volitional stool retention	25	26	0.718
History of painful defection or hard bowel movements	28	27	0.642
The presence of a large fecal mass in the rectum	19	24	0.157
History of thick stool with toilet obstruction	26	25	0.959
History of large-diameter stools	29	28	0.561

Table-III: Comparison of Rome criteria of the control group before and after the 4-week trial

Parameter	Stagers		p-value
	Before	After	
≤ 2 defecations per week	26	20	0.075
≥ 1 episode/week of incontinence after the acquisition of toileting skills	17	11	0.123
History of retentive posturing or excessive volitional stool retention	26	20	0.075
History of painful defection or hard bowel movements	27	21	0.064
The presence of a large fecal mass in the rectum	24	16	0.032
History of thick stool with toilet obstruction	25	19	0.086
History of large-diameter stools	28	22	0.053

Table-IV: Comparison of Rome criteria of the case group before and after the 4-week trial

Parameter	Stagers		p-value
	Before	After	
≤ 2 defecations per week	24	2	<0.001
≥ 1 episode/week of incontinence after the acquisition of toileting skills	18	1	<0.001
History of retentive posturing or excessive volitional stool retention	25	3	<0.001
History of painful defection or hard bowel movements	28	5	<0.001
The presence of a large fecal mass in the rectum	19	2	<0.001
History of thick stool with toilet obstruction	26	3	<0.001
History of large-diameter stools	29	4	<0.001

Discussion

This study showed that a diet free of proteins from CM (Cow's milk) significantly improved all Rome criteria for constipation. CMPs can cause inflammation, slow BM (Bowel movements), and increase eosinophilia, leading to heightened resting pressure of the internal anal sphincter, resulting in constipation and anal fissures.[15] Atena Bourkheili et al reported that hypersensitivity to CMP can cause constipation in children, suggesting that eliminating dairy products may improve symptoms.[16] CMP allergies are more predominant in children at the age of <7 years.[17] Walker et al discovered that FA (Food allergies), particularly cow's milk allergy (CMA), decreases with age.[18] In this study, 57% and 43% of the participants were male and female respectively. The mean (±SD) age in the cases was 6.33 ± 0.5 years, compared to 6.6 ± 0.6 years of the control group (p=0.063). Atena Bourkheili et al studied children within similar age ranges.[16] Dehghani et al found an 80% response rate to a four-week removal of CM (Cow's milk) from the food[8] while El-Hodhod et al reported a 77% response rate.[19] Another study revealed that 28-78% of children with constipation improved on a CMFD.[20] Additionally, research indicated that a diet high in dairy food and low in fiber contributes to constipation in children.[21] In this trial, when comparing the RC for the participants of the control group before and after the 4-week trial, not any significant difference was observed in the scores, excluding the parameter "presence of a large fecal mass in the rectum" (p=0.032). On the other hand, in the case group, significant differences were noted in the scores for all parameters after the 4-week trial, with p-values less than 0.001. Daher found that children suffering from constipation who showed improvement after a CMFD had elevated IgE antibodies and a +ve (Positive) skin prick test.[22] A study observed that constipation resolved within 1-5 days of eliminating dairy and recurred upon reintroducing it, suggesting the involvement of delayed allergic reactions.[7] Another study found that constipation was related to CM (Cow's milk) consumption in nearly two-thirds of the participants (Children), with painful defecation (PD) or hard stools reappearing 5-10 days after resuming a diet that included CM.[9] Andıran et al disclosed that infants and younger children suffering from anal fissures and CC consumed more cow's milk compared to those with regular bowel habits.[23] Turunen et al suggested that avoidance of CMP for two to four weeks might effectively treat constipation in children.[24] However, Simeone et al reported no perfections in 11 children who were suffering from constipation following a four-week CMFD.[11] It is recommended to eliminate dairy food as well as cow's milk from the diet for children with FC who do not respond to laxatives and fiber treatments.[16] The findings of this current study could be valuable for future related research.

Limitation of the study

This was a single-centered study with a small sample size and conducted over a short period. Therefore, the findings may not accurately reflect the situation across the entire country.

Conclusion & Recommendation

Children suffering from chronic constipation unresponsive to laxatives may find relief through a cow's milk-free and dairy-free diet. This dietary modification can address potential intolerances or sensitivities to dairy products that exacerbate constipation. By eliminating cow's milk and dairy, some children experience significant improvements in bowel function and overall well-being. However, it is essential to consult with healthcare professionals before making these dietary changes to ensure that all nutritional requirements are met and to monitor the child's progress appropriately. Adopting a personalized approach can yield promising results in managing chronic constipation in children effectively.

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